



The Magazine for Information Executives

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How to Keep a Good Company from Going to Waste

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Waste Management CEO Maury Myers (left) and Senior VP of IT Tom Smith say: "He who has the best information always wins."



The Magazine for Information Executives



The Secrets of Their Success

TURNAROUND AT WASTE MANAGEMENT

How to Keep a Good Company
from Going to Waste Page 62

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The Secrets of Their Success

If your company's profits have vanished and systems are sunk, who you gonna call? At Waste Management, they called Maury Myers and Tom Smith, and now they're glad they did. *By Stephanie Overby*

Back-to-Back Winners: The turnaround team of CEO Maury Myers (left) and Senior VP of IT Tom Smith are at it again—this time at Waste Management.

PHOTO LEFT AND COVER BY DANNY TURNER

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I.T. SPENDING IT is the best way to force improvements in the ways people do their jobs. Learn what to spend your money on and where to save. *By Christopher Koch*

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I.T. SPENDING SURVEY You might be surprised to hear how much your peers are shelling out for technology—and that your CFO is targeting your budget for cuts. *By Lorraine Cosgrove Ware and Ben Worthen*

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What You Need to Know About Public and Private Exchanges

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B2B E-COMMERCE The choice isn't just whether to join an exchange, but whether to go public, private or a combination of both. *By Elana Varon*

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PROJECT MANAGEMENT To tackle a big IT project, J.P. Morgan Partners cuts it into small pieces and throws lots of parties. *By Eric Berkman*

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SOFTWARE SALES Our reporter ventures into sales territory to scope out some tricks of the trade. *By Scott Berinato*



“Sales is a hurt-and-rescue operation. You're hurting CIOs in order to rescue them.”

—Edd Brown of Solution Selling, Page 110

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TOTAL LEADERSHIP If you want to succeed as a leader, make sure you have a first-class leadership network.

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INTERVIEW Kennard looks at the effect 1968's *2001: A Space Odyssey* has had on today's technology and technologists.

By Lafe Low

SURVEY SAYS... PAGE 84

IT Spending and Lessons Learned

Our exclusive survey reveals some surprises about who's spending what—and how CFOs are taking a closer look at CIOs' budgets.

The good news is that in today's tough economy, IT is more closely aligned with business initiatives than ever. The bad news is that executives' opinions vary widely when it comes to IT spending (right). For more on the results, turn to Page 84.

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Global furniture retailer Ikea found that its new financial system came with some assembly required.

By Malcolm Wheatley

WORLDVIEW B2B applications remain scarce, even in the countries that should be leading the way. 58



Global legacy systems, the euro conversion and the Y2K deadline couldn't stop **Ikea's Ulrika Martensson** from delivering a new financial system on schedule. Read her story on Page 52.

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Should CIOs jump on InfiniBand's speeding bus? *By John Edwards*

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DIFFERENCE ENGINE If you think IT can provide cultural unity, you're part of the problem.

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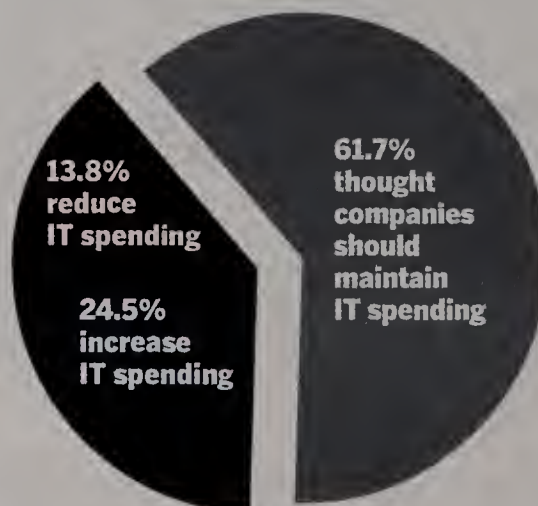
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Reader feedback

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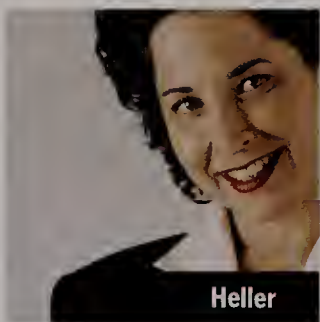
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Heller

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For opinion on managerial, political and ethical dilemmas that confront CIOs daily, read Executive Web Editor Martha Heller's column and join the debate. comment.cio.com

FRIDAY The 35 Cent Consultant

Questions about strategy? Staffing?

Integration? Executive Editor Derek Slater gives readers advice that's worth every penny. www.cio.com/35cent

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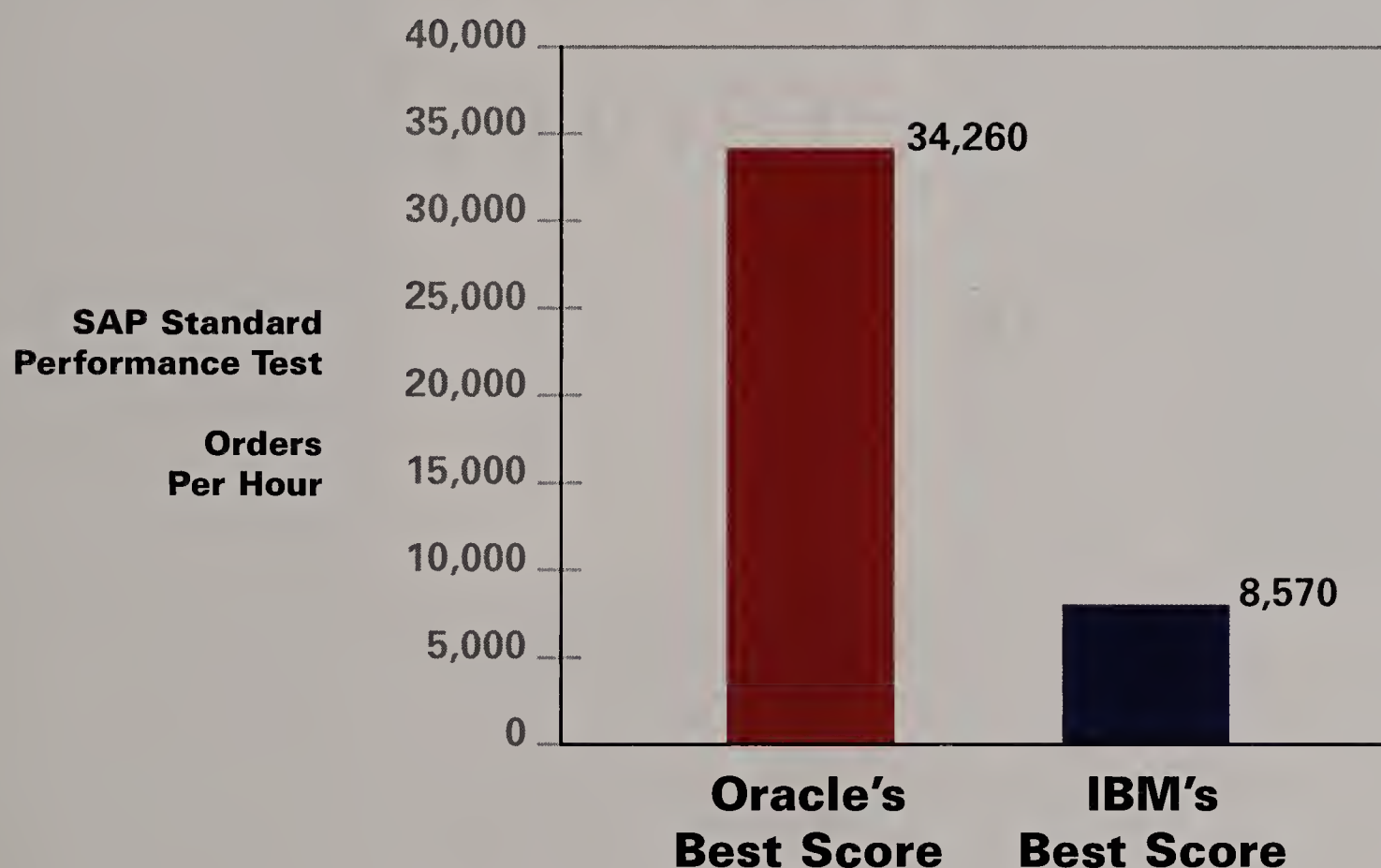
CIO RESEARCH REPORTS

Read the details of the "IT Spending and Lessons Learned" survey highlighted in this issue (www.cio.com/printlinks). Each month Research Editor Lorraine Cosgrove Ware publishes the highlights from surveys answered by your peers. Discover what other CIOs and business executives think about measuring IT value, buying decisions, alignment issues and much more. www2.cio.com/research

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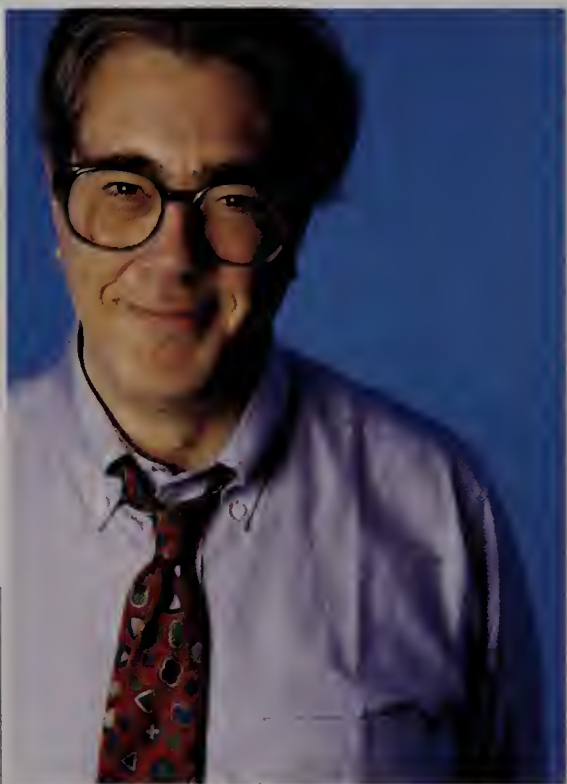
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SAP Standard Application Benchmark as of May 29, 2001. These benchmarks fully comply with SAP Benchmark Council's issued benchmark regulations and have been audited and certified by SAP. Certification Number: 2001018 ORACLE 8.1.7, 128 way, Sparc64 560Mhz, 128 GB, Solaris8, 2-tier. Certification Number 2000025 DB2 UD8 7.1, 24 way, RS64-IV 600Mhz, 32GB, AIX 4.3.3, 2-tier. For more information on these benchmarks, see <http://www.sap.com/benchmark>. Copyright © 2001 Oracle Corporation. All rights reserved. Oracle is a registered trademark, and Software Powers the Internet is a trademark or registered trademark of Oracle Corporation. Other names may be trademarks of their respective owners.

From the Editor



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Inspirational and Operational

MORE OFTEN THAN NOT, business magazines—*CIO* included—feature pictures of businesspeople on their covers. These portraits generally show well-groomed, usually smiling folk, glowing with success. As editors, we expect that our readers will be drawn to these images because we know that most people are somewhat less well groomed, and perhaps fret that they are not as successful as they could be. We hope that our readers will see these images and on some level think that by reading the story they will come to resemble that fortunate person on the cover.

Of course, most stories about business leaders, ours included, fail to deliver on that promise, and that's no surprise. The notion that one man (or one woman) is individually responsible for an entire enterprise's success (or failure) is almost always fallacious. The real secrets to business success are not so easily teased out. Success is invariably the product of the work of many individuals, and it often depends on such unfathomables as macroeconomic factors and pure dumb luck. The value we can derive by reading about one man or woman's achievements is mainly inspirational, rarely operational.

Except, we humbly suggest, in the case of the story about the two men gracing the cover of the issue you are currently holding: Waste Manage-

ment CEO A. Maurice "Maury" Myers and Senior Vice President of IT Tom Smith.

What makes "The Secret of Their Successes" (Page 62) different is that its subjects are not being profiled because of who they are (although they seem like nice enough guys), nor because they happen to preside over a successful enterprise (which, as a matter of fact, they do), but because they've developed and clearly articulated a suite of turnaround management best practices that can be applied to any enterprise, in any circumstances, by anyone. So in this case, you *can* be like that person on the cover. All you need to do is follow the rules...and work hard. As you read the story, and read about Myers and Smith waking up and going out on the road at the crack of dawn to meet their employees, it becomes crystal clear that hard work is the real foundation of any business success.

The other element that makes this story perfect for *CIO* is the partnership between CEO and CIO—the CEO appreciating the centrality of IT, the CIO understanding the business drivers. Together, and only together, they make quite a team and are much more than just pretty faces.

(One of Myers' rules—in fact, his first—will certainly warm the cockles of any CIO's heart: "He who has the best information always wins.")

A handwritten signature in black ink, reading "David Rosenbaum". The signature is stylized with a large, sweeping "D" and a long horizontal line extending to the right.

Managing Editor
drosenbaum@cio.com

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Reader Feedback

BROADBAND DEFINED

I would like to see the term *broadband* used correctly ["UCITA Backlash," *Washington Watch*, April 15, 2001]. Of course, when our outgoing FCC chairman defined broadband as any transmission service over 1Mbps, I knew the term had lost its meaning forever. Defined correctly, broadband refers to transmission media with discrete channels for individual users or sessions. Baseband is transmission media with a shared channel. The last run of cable in neighborhoods where multiple households share the media is baseband. DSL—like its cousin ISDN—is broadband.

Ed Mahoney • Network Architect • IBM • White Plains, N.Y. • emahoney@qwest.com

STAFFING AND AGEISM

I disagree with the theory that there is a staffing crisis ["The High Price of Age Discrimination," May 15, 2001]. Our company has surveyed the job market during a period of two years, particularly the IT sector, and we have determined that it is indeed a buyer's market—but not a crisis. We maintain business relations with more than 20,000 IT staffing companies. Through these contacts, we are given daily requirements for candidates. On the average, we receive nine candidates for every job, which is not as bad as we suspected prior to our survey.

Many companies were in a big rush to go public, not for the sake of money, but more for the prestige and status they would have. The IT sector was hit the hardest when fools finally had to admit they were not worth billions. Another factor involved was the budgets established in 1999 to handle Y2K. Many budgets were disrupted because of the market crash. Managers now have the accounting approval to move forward on the projects stalled by the media's attempt to crash the market.



Glenn Fogerty

President and CEO

Alle Von Technologies

Hazlet, N.J.

allevon@allevontech.com

I am just 69, but there is no way that after more than 30 years in the role of a CIO another company will hire me as a CIO.

I teach IT part time at a university, work full time as a systems analyst and do some outside IT consulting, but I have hit the ceiling—it's a fact of life.

I feel that CEOs look for a CIO who is strong in technology. They then have top managers without management ability. I prefer hiring an individual who is an expert in managing experts.

Bill Anderson

Senior Systems Analyst

Health Net

Woodland Hills, Calif.

william.anderson@healthnet.com

In February 2000, I filed my last job application. It was to the San Francisco office of Ask Jeeves, which was planning to open an office in Sydney, Australia. The recruiter was in London.

An enthusiastic young man called and said he never thought he would find a candidate like me. He explained the interview process: six interviews, the last of which would be by video-phone. Then I would be in San Francisco for three months of training. He told me if I didn't have a passport, I should apply for one, because I was an absolute certainty for a position.

Several nights later I received a second phone call from an irate woman who told me I should never have been called in the first place. She said Ask Jeeves prefers to hire men age 22 to 28.

I just turned 51. My degrees include postgrad librarianship, with an emphasis on computing. I bought my first computer in 1980, so I have a fair bit of experience. I also have a résumé that I've been told is intimidating.

Today, everyone is short of young, cheap coders. The estimate of staffing needs is wildly inaccurate and misleading. One estimate of IT staffing needs included 150,000 call center personnel—hardly a degree-qualified position. These staffing surveys are based on the fantasies of recruiters boosting their own importance in the food chain.

I have spent most of the last six years applying for jobs—and with some satisfaction—with companies that hit the wall precisely because people like me weren't hired. I still believe my experience to be worthwhile, and like many a boomer before me, I plan to rely on self-employment.

Deborah Ehrlich

Owner

The Information Coach

Sydney, Australia

dehrlich@start.com.au



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Service Providers: The New Breed

The Application Service Provider model has grown up and become what the IT user really needs these days, namely a Full Service Provider or FSP. Sharing the same monthly subscription or usage-based fee structure as the ASP model, the FSP model provides IT with consulting, application customization and integration, managed services, hosting, and other vital enterprise services.

"It has become increasingly difficult for IT departments to maintain all the connectors between their own custom code and today's enterprise applications, which are constantly being modified," says Tony Summerlin, Vice President of e-Business Strategy at Unisys Corp. "That's where the FSP can help. As you consider your legacy systems, the more you try to integrate new applications, the more the FSP is relevant."

Summerlin notes that the FSP model plays perfectly into the core strengths of Unisys and its rich experience in providing enterprise information solutions, application customization, and data center infrastructure.

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SUCCESSFUL CRM

I applaud "The Truth About CRM" in the May 1, 2001 issue. As you suggest, CRM packages have been sold for years, primarily as departmental solutions with ill-defined goals, nonexistent business-user buy-in and suspect executive involvement.

Two points made within the article, however, appear inconsistent. Vendor accountability, as defined by Liz Shahnam of Meta Group, should be immediate, not within one year. For the application providers and the systems integrators, customers deserve accountability for mismanaged expectations and solutions that fail to deliver value.

Second, the trick to successful CRM implementation is more than simply working with qualified and certified systems integrators. A better approach is to carefully choose consultants who understand the importance of defining and managing end user expectations and who will achieve management buy-in and gain executive sponsorship.

Rock Griffin

Executive Vice President

Financial Services Division

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Lexington, Mass.

griffinr@logica.com

DAMAGE CONTROL

I actually agree with most of the article about bringing in the FBI ["Outbreak," June 1, 2001].

I have been watching articles on denial-of-service attacks for quite some time now. I have only one thing to comment on. Too many smaller companies or websites fall way beneath the \$5,000 damage mark that must be realized before you can get help from the FBI.

We are rapidly approaching the point where something must be done, though. Sooner or later one of these hackers is going to hit not just one but two or three major crossroads of the Internet at the same time. It would not take much to coordinate such an attack if the perpetrator had the patience

to wait until he had enough bots under his control. What happens then?

John P. Harper

Security Administrator

EDS

THE VALUE OF PRINT AND WEB

I have read *CIO* since it arrived on the scene, and it's one of my favorite professional publications.

I really like that you place the full text of the print editions online. I read *CIO*, *Darwin*, *Fast Company* and at least 25 more cover-to-cover. I also send no fewer than four articles via the online "send this page" feature from each magazine to literally dozens of associates, colleagues and clients each month.

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CORRECTION

The Port of Houston was omitted from our list of the 10 largest U.S. home ports in the sidebar, "How Your Home Port Stacks Up," July 1, 2001. In fact, it ranks ninth with 1,001,170 TEUs ahead of Savannah, Ga., and behind Tacoma, Wash. This bumps the Port of Miami from the top 10 list of largest ports.

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Edited by Sara Shay

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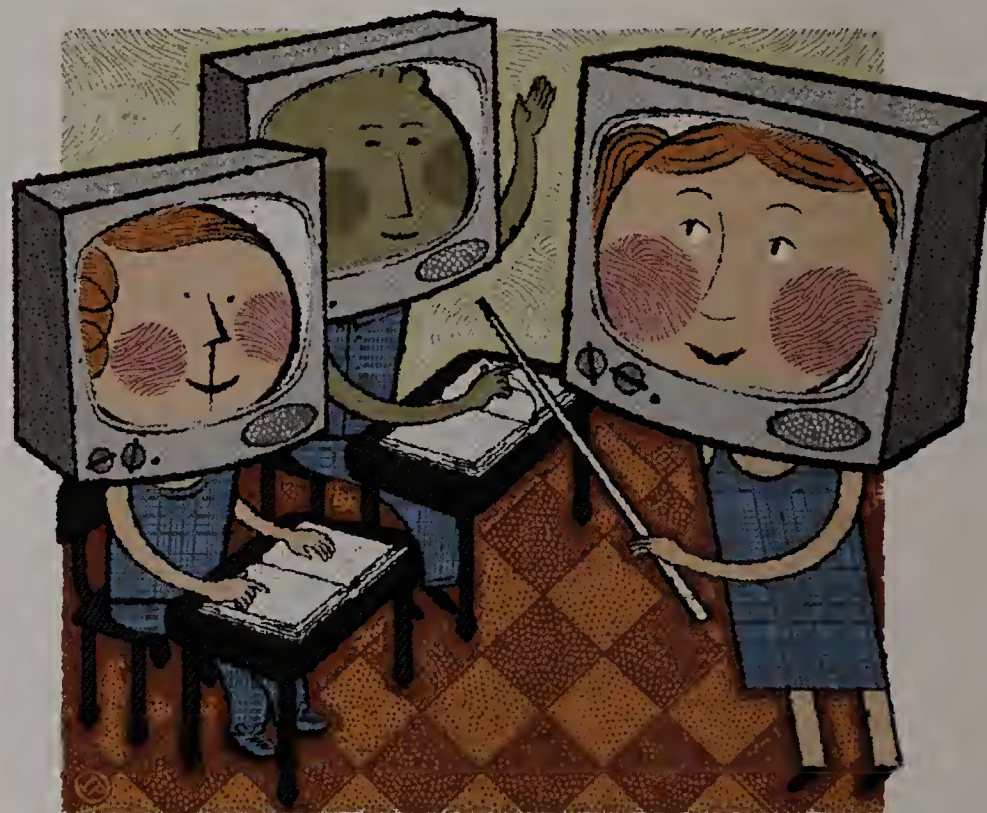
By Meg Mitchell Moore

VIDEOCONFERENCING hasn't exactly fulfilled its promise in the corporate world ("What's that, Bob? You want to plan a corporate takeover? I can't hear you with all this static....Oh, a corporate *makeover*?"), but a few universities are putting the put-upon technology to innovative uses.

Last semester at the University of Washington in Seattle, geology professor Elizabeth Nesbitt used videoconferencing to teach students in six area high schools. The students, many of whom are minorities from rural areas who might not otherwise get to take classes for college credit, gathered once a week at their respective schools for videoconferencing classes that Nesbitt taught from Seattle. Nesbitt sent materials in advance, including boxes of rocks and minerals (actual, not virtual), and each school had a science teacher on hand during the classes.

At first, the classes suffered from some technology glitches—"The main problem seemed to be the network we were hooked into," Nesbitt says—but by the end, things were flowing like lava. The university plans to continue the program this fall.

Meanwhile, at Purdue University in West Lafayette, Ind., the Purdue Program for Preparing Tomorrow's Teachers to Use Technology, or P3T3 (tongue twisters, anyone?), allows education students to use videoconferencing to observe and communicate with K-12 classrooms in urban East Chicago, Ind. P3T3 is funded by a grant from the U.S. Department of Education. The purpose of the videoconferencing initiative is twofold: to allow Purdue students to observe diverse urban classroom settings and to increase their familiarity with technology in the classroom. The classes employ Polycom videoconferencing equipment via the Internet, which allows teachers in training to present interactive lessons and even pan out or zoom in on specific students.



So far about 25 students from two classes in professor JoAnn Phillion's introductory teacher education course have participated in the program. Some snafus, such as shaky audio and distracting background noise, have proven unavoidable. And not all the K-12 schools have enough bandwidth to support the videoconferencing. "The biggest problem has actually been getting the schools' technical support personnel to work with our technical support people to punch a hole in the school's firewall," says James Lehman, codirector of the project and a professor of educational technology at Purdue. Nevertheless, the university is considering allowing all student teachers at Purdue to take part in similar projects.

"WHEN YOU ORDER A CADILLAC WITH LEATHER SEATS IN BOSTON, THE COWS IN TEXAS START SWEATING." —Bill Rogers, vice president of IT and e-business at

Johnson Controls in Plymouth, Mich., on how the collaborative commerce technologies he is investing in will affect supply chain visibility



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E D U C A T I O N

No More Paper, No More Books

AS TECHNOLOGY CONTINUES to pervade the classroom (see "Stay Tuned for More Knowledge," Page 26), even the classic textbook is in danger of being relegated to the shelves of historical artifacts. By the year 2005, digital delivery of custom-printed books, textbooks and e-books will account for 17.5 percent of the publishing market and produce nearly \$8 billion in revenue, according to Cambridge, Mass.-based Forrester Research.

The content of a digital textbook is stored in a computer file that lives on the Internet or on a student's hard drive. To access the information, students and teachers download a reader application from the respective e-textbook company, which presents the content in a booklike

format. As with traditional books, readers can then highlight passages, scribble notes in the margins and dog-ear pages. Students can also search the text by word or phrase. Some digital textbooks cost the same as their paper counterparts, while others cost from 30 percent to 50 percent less.

One advantage of a digital textbook is that professors can comment on the material online to reinforce readings or set up discussion sections about particular readings by placing a URL next to the text in question. URLs can also link to websites, self-tests and other study tools.

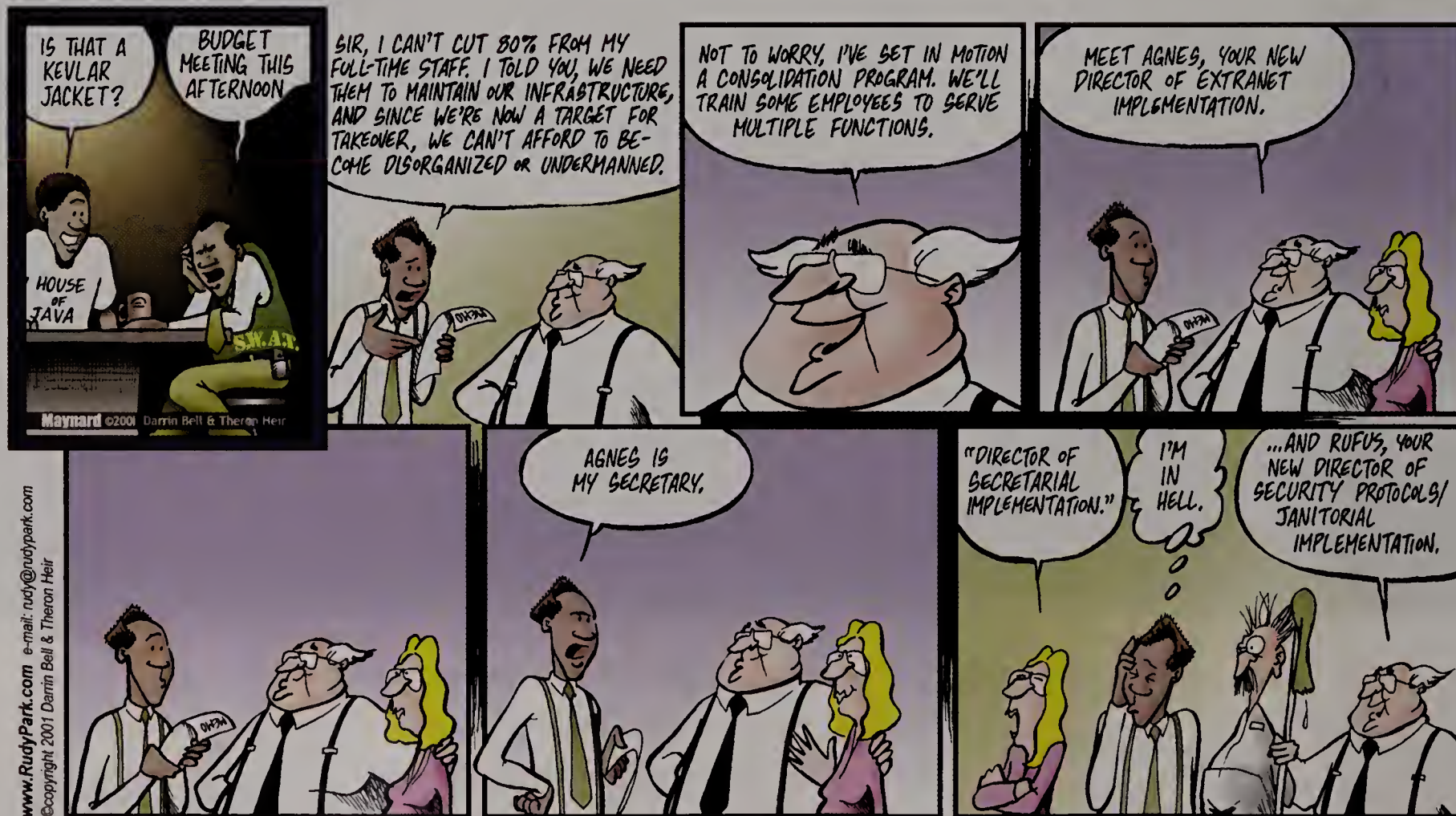
Student access to digital textbooks varies according to the textbook company. MetaText, a subsidiary of NetLibrary based in Boulder, Colo., is acces-



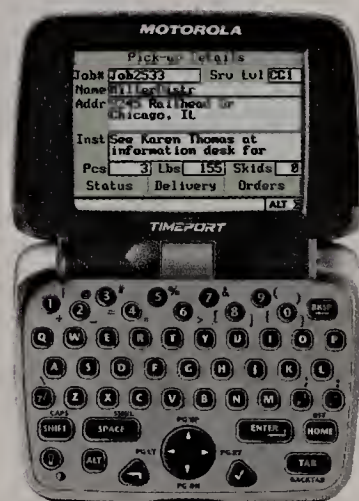
sible only to Web-enabled computers. New York City-based WizeUp.com's texts are available through downloads, which can clog up both a school's network and space in a student's hard drive. Rovia, based in Boston, requires students to access the books online but recently began to allow students to check out chapters for offline use. —Joe Kendall

Maynard

BY DARRIN BELL AND THERON HEIR



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By the Numbers

By Lorraine
Cosgrove Ware

Simplify Your Computing Environment

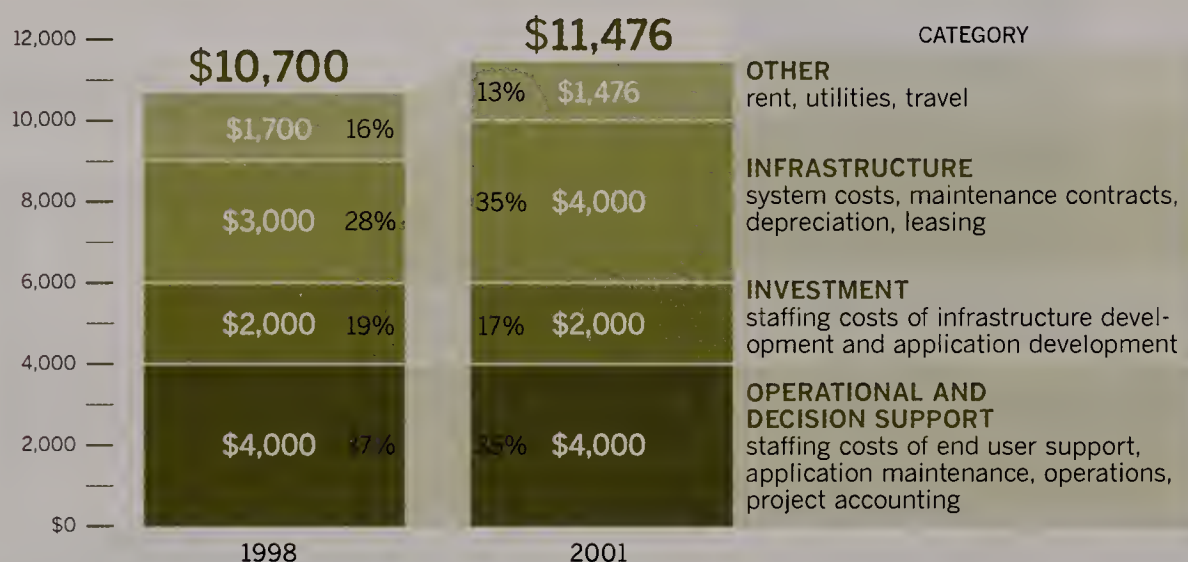
Keeping your PCs, servers and applications simple can reduce headaches and IT expenses, according to the results of Hudson,

Ohio-based Hackett Benchmarking & Research's annual survey of Fortune 500 companies.

IT Costs Are Rising

Annual IT costs per end user in companies with 1,000 employees or more will rise to \$11,476 this year—a 7% increase since 1998.

AVERAGE I.T. COSTS PER USER



Comply with IT Standards and Lower Costs

Survey respondents were asked how stringently they complied with their companies' IT standards. Respondents that had low compliance (less than 50 percent) had per-user IT costs of \$7,414 per year. Companies that indicated they had high compliance (85 percent) lowered per-user IT costs to \$5,376.

ANNUAL I.T. COSTS PER USER



“Unless CIOs draw a line in the sand and enforce policies for fewer supported PC configurations and data standards, costs will continue to spiral out of control.”

—Richard Roth, managing director,
Hackett Benchmarking & Research

Best Practices

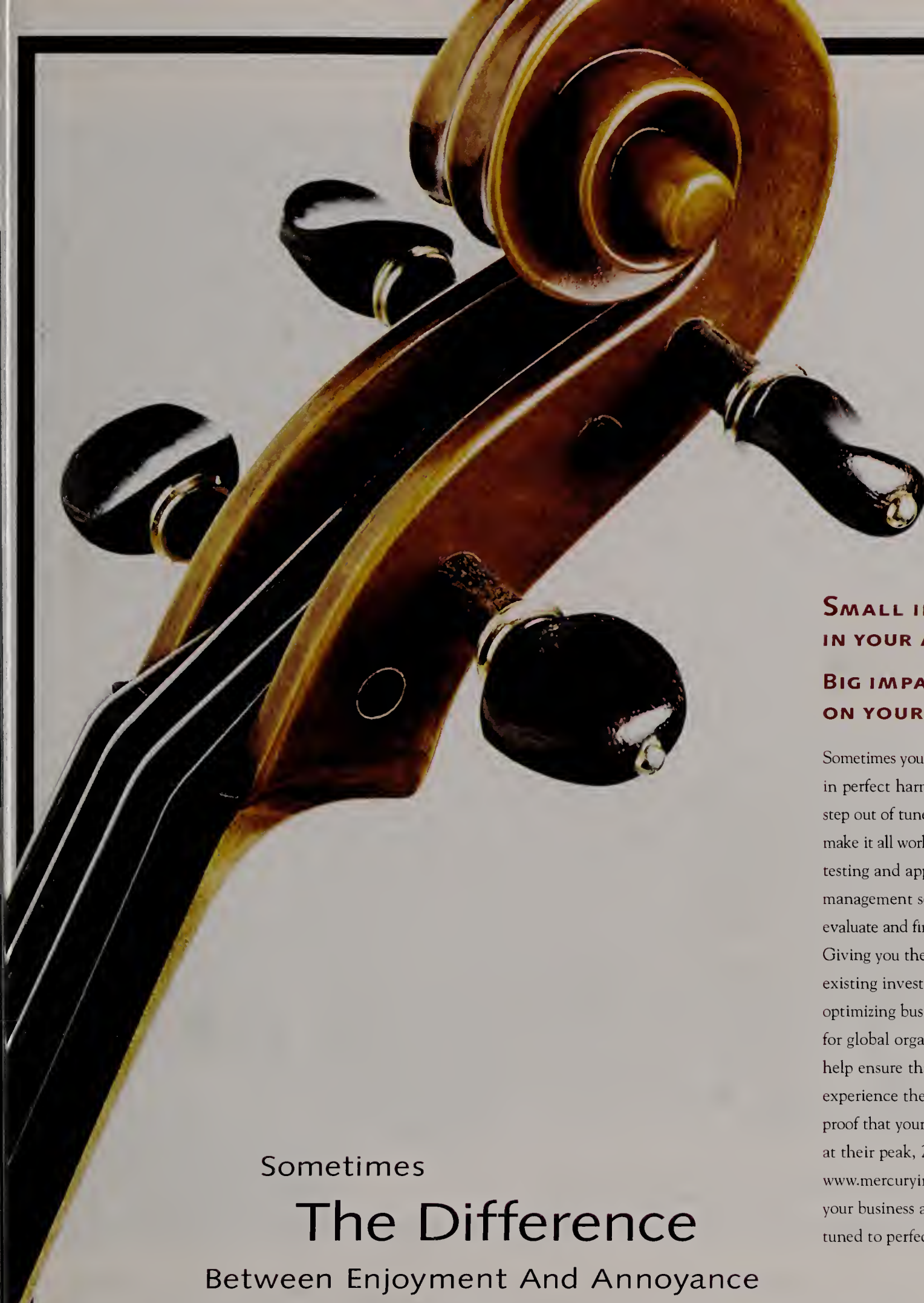
1. Make Your PCs “PC.” Minimize the number of supported PC and server configurations and components like processors, memory and storage. Set standards for users' computers and servers in terms of the number of different vendor brands and models you purchase.

2. Minimize the number of applications—office suites, tools and e-mail packages—that you support. Results from the Hackett study found that companies that supported fewer business applications had lower costs and lower complexity. For example, financial organizations that supported fewer than 10 business applications per 1,000 users lowered their per-transaction processing costs.

3. In many cases, CIOs inherit multiple computing platforms and applications from mergers. Roth suggests that CIOs involved in mergers determine the value proposition of merging the two different IT organizations. “CIOs need to identify their competitive advantage and then make a long-term plan that addresses what needs to be standardized and when,” Roth says.

Suggest future topics to
numbers@cio.com.

SOURCE: HACKETT BENCHMARKING & RESEARCH 2001 BOOK OF NUMBERS, FEBRUARY 2001



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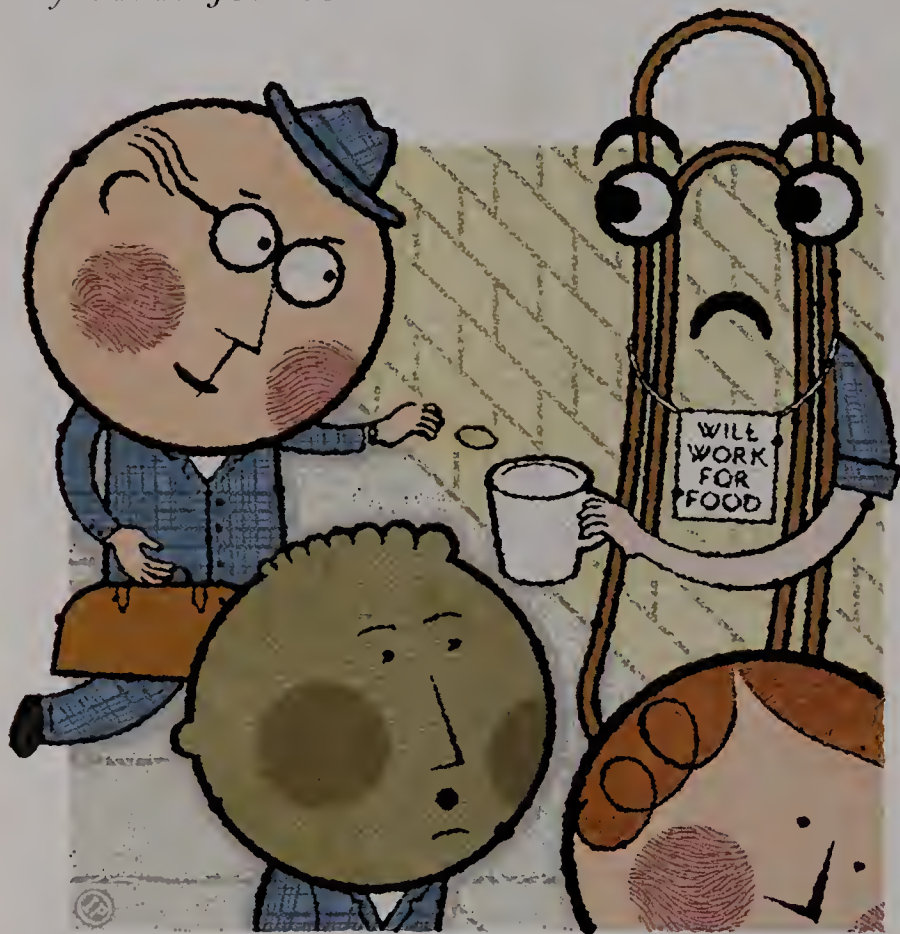
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STAFFING

Total E-Clips of the Heart

By Sarah Johnson



JUSTICE HAS FINALLY BEEN SERVED in the world of Microsoft—and we're not talking antitrust law. When it created Windows XP, the software giant axed Clippy, that annoying bug-eyed paperclip. Now the persistent office assistant that had been irritating Microsoft Office users since Windows 97 is begging for work on www.officeclippy.com.

Here's your chance to vent your frustrations with the disruptive and always-eager-to-teach animated piece of metal. You can vote for his next career move (Should he become a lock pick or a metal band member?), listen to his bluesy and sorrowful song "It Looks Like You're Writing a Letter," and read his snappy, trendy quotes ("At least I'm not a sock puppet" and "Does this website make me look fat?"). The site also features three streaming videos starring Clippy, his parents and siblings, and the IS characters who can't stand him.

After a while, you might even begin to feel bad for the helper that tormented anyone computer-literate enough to use a mouse. He assumes that XP stands for ex-paperclip without realizing the letters represent experience. He even sheds a few tears.

But losing his job isn't the worst thing that's happened to Clippy. To promote the XP launch, he's portrayed on the website by Gilbert Gottfried, the entertainer whose nasal, earsplitting voice has been featured in commercials and movies, including Disney's *Aladdin*.

Sometimes a clip can't get a break.

HOT TOPIC



E-COMMERCE

The Name Game

By Meg Mitchell Moore

MOVE OVER, .COM. There are two new suffixes in town, and they're generating some serious buzz. This month .info went live, and the beginning of October brings .biz to an Internet near you. More are on their way; last year the Internet Corporation for Assigned Names and Numbers approved the development of seven top-level domain names. The others are .name, .pro, .aero, .coop and .museum. The new domains will be operated by Newtown, Pa.-based Afilias and Sterling, Va.-based NeuLevel.

But things have changed since .com and .org made their debut. Once, cybersquatting was the easiest way to make a buck in the new economy. All you had to do was register a domain name that an individual or a company would find desirable—such as www.coke.com or www.money.com—and then sell the name for many, many times what you paid for it. But with the new domain names, cybersquatters may have to start working for a living. Both companies that operate the new domains have taken steps to minimize cybersquatting. Afilias, which will operate .info, held a "sunrise period" in June and July during which only customers with a nationally registered trademark could apply for a .info domain name. Such actions were not necessary when the first top-level domains appeared in the 1980s. "There's been a repurposing of what [the Internet] has been used for," says John Kane, marketing task force leader for Afilias. "It was imperative that we have a sunrise period."

NeuLevel, the company in charge of the .biz domain, allowed businesses to submit a trademark claim (for a fee) prior to the application process. Most likely these precautions won't eliminate cybersquatting altogether, but the registries hope they will make it much trickier.

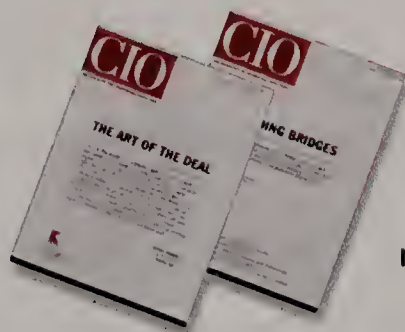
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On the Move

Compiled by
Lauren Capotosto

Pioneer's Parting Words

BRADLEY DUGGER is in what he calls brain-dumping mode. CIO of the State of Tennessee since 1987, Dugger, 60, retired from the IT ranks on June 29. He spent his last days consolidating 14 years of information for successor Vic Mangrum, formerly among Dugger's senior staff. Dugger, who now plans to spend his free time growing his 24-year-old security alarm business, was one of the first state CIOs in the country. He served as president of The National Association of State Information Resource

Executives (NASIRE)—now National Association of State Chief Information Officers, or NASCIO—and most recently chaired its governmental relations committee. He's credited with signing a five-year contract to privatize a statewide network and with leading Tennessee's e-government initiatives. On one of his last days at work, *CIO* spoke with Dugger about his thoughts on IT in state government.

CIO: What advice would you give your successor?

Bradley Dugger: Be involved in what other states are doing. I spend a lot of time in Washington, D.C. I am a member of four intergovernmental committees, and I have worked pretty aggressively in [NASCIO] for a number of years. I learned from those experiences. I really saw where things are going globally in government.



Bradley Dugger

You need to know what others are doing, and you need to steal unmercifully from them. I would also encourage my successor to be actively involved with the legislature, helping it do its job.

And the third thing I would say is: Don't try to be a whiz on technology. I try to understand the concepts and where things are going, but I have people on staff who have technical expertise. When I try to get in a certain area, I have them pour what I need to know into my brain. I think you really need to depend on other folks.

For more of the interview, check out www.cio.com/printlinks.



Player's Guide

Richard Decker

Mentor Graphics

As the new CIO of the Wilsonville, Ore.-based provider of electronic hardware and software design solutions, Decker, formerly the company's vice president of information technology, is responsible for offshore engineering product development, global engineering support and communications.

Jesse Juarros

Regulus

Formerly general manager of the information technology agency for the City of Los Angeles, Juarros has been named CIO of Regulus, an independent billing and remittance processing company in Philadelphia. In his new role, Juarros will manage strategic planning, technology development, and growth and management of internal IT and capacity planning.

Douglas T. Parrish

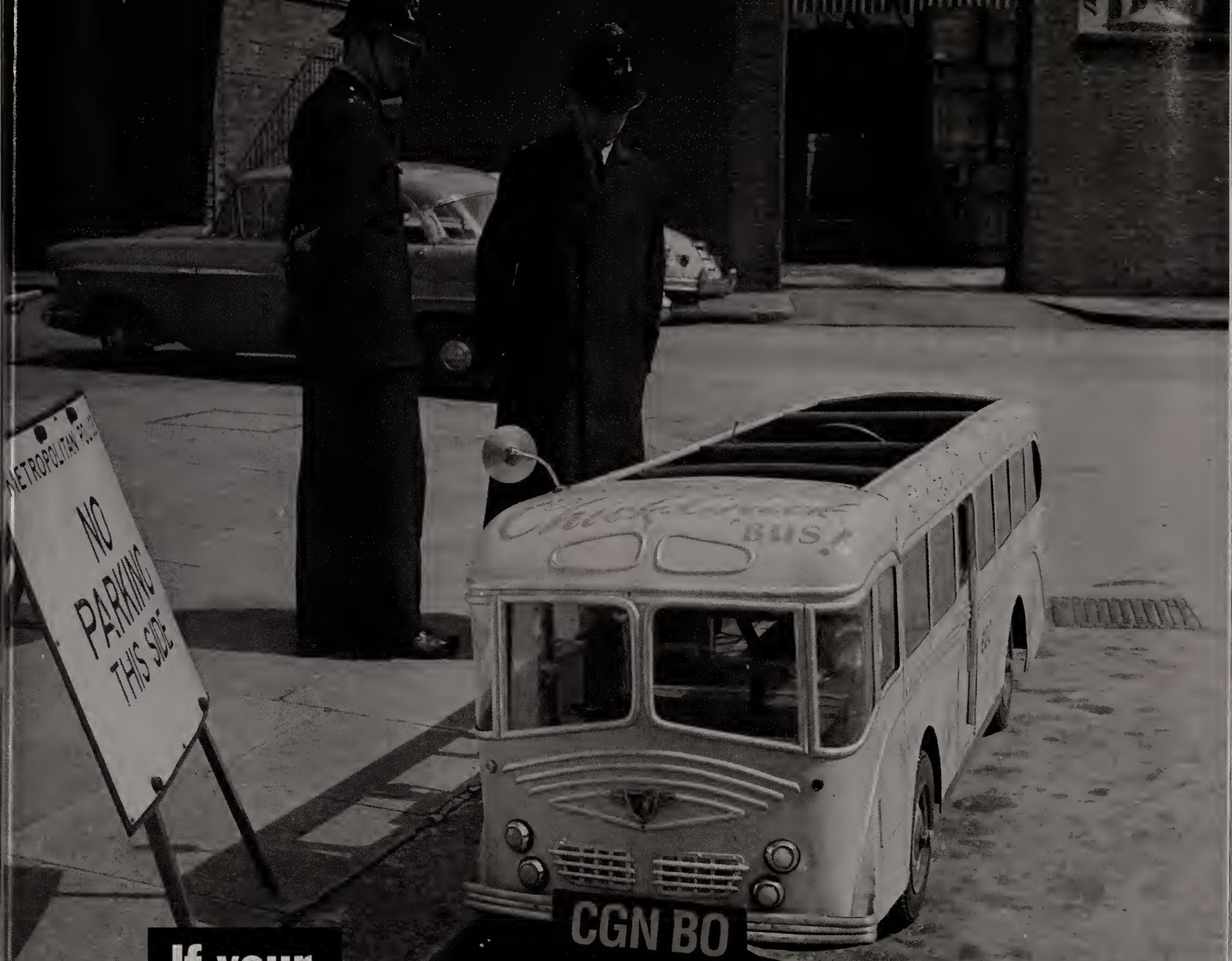
Walt Disney Internet Group

Formerly CIO of Cambridge, Mass.-based Polaroid's consumer imaging business, Parrish has become CIO for the Walt Disney Internet Group in North Hollywood, Calif. He is responsible for overseeing the technology platform, infrastructure and applications for the company's Internet properties.

Elizabeth Shuttleworth

Radian Guaranty

Shuttleworth joins as executive vice president of operations and CIO of this Philadelphia-based mortgage insurance company. Formerly CIO and vice president of IT for Cherry Hill, N.J.-based Vlasic Foods, Shuttleworth will develop and implement technology strategies to enhance the company's internal processes and business systems.



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THE GLOBAL ENTERPRISE

Leave a Smaller Footprint

By Simone Kaplan

THOUGH THE BUSH administration has not made preventing global warming a priority, studies show that massive damage will be inflicted on the planet if ozone depletion is not halted. The U.S. Global Research Program recently reported that if emissions of greenhouse gases do not decrease, average temperatures in the United States will rise at least 5 to 9 degrees Fahrenheit in the next century, causing droughts, floods, the disappearance of fragile species and the destruction of ecosystems.

To publicize the importance of reducing emissions of ozone-depleting gases, the World Resources Institute, a Washington, D.C.-based nonprofit think tank, has launched www.safeclimate.net, a website devoted to helping individuals and organizations calculate and reduce their output of carbon dioxide.

"We don't have to wait for our government to lead," says Jonathan Lash, president of the institute. "SafeClimate.net provides an opportunity for concerned citizens and organizations to do their part and demonstrate concern on this issue."

SafeClimate.net's main tool is a calculator that measures your "carbon footprint," or the amount of carbon dioxide emitted by your activities or those of your business. Here's how it works: The calculator compares the amount of electricity, natural gas and heating oil a company uses to the amount of office space used per square foot and the number of car or air miles traveled by employees each month. Individuals can enter the same information and get a personal footprint calculation.

The site then suggests ways to reduce the carbon dioxide footprint, such as conserving energy, cutting back on travel and paper consumption, and eating more organic foods. The site contains links to sellers of energy-efficient lightbulbs and other appliances that can help.

"Every step toward carbon reduction is a meaningful one in reducing the threat of global warming," Lash says.



CONNECTIVITY

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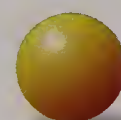
OK, MAYBE NOT. But to create that illusion, you can borrow the king of rock and roll's name by going to Elvis.com and signing up for a free personal e-mail account. Elvis.com is the official website of Elvis Presley Enterprises in Memphis, Tenn., a product of the Elvis Presley Trust, which is funded by the Presley family as well as money the legend left in his will.

The e-mail promotion celebrates the site's name change from Elvis-presley.com to the more recognizable Elvis.com. The site links Elvis fans of every age from all over the world and promises up-to-the-minute updates on all things kingly. More than just a newsletter reporting that "Elvis is still dead," it tells you all about places to hear, see or touch things connected with the king, such as Elvis Presley Ave. in Shreveport, La., or the new musical *Jailhouse Rock*, set to debut in September. According to Scott Williams, manager of marketing and communications at Elvis Presley Enterprises, 100 to 150 customers per day are signing up for personalized e-mail accounts. The total at press time was more than 30,000 people, and Williams promises all of America can have an Elvis e-mail. But the question remains...young Elvis or old Elvis?

—Stephanie Viscasillas



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Ask the Expert

Advice from People Who Know

Let's Get Together

John Orcutt, CEO of Mountain View, Calif.-based Actional, an integration architecture provider, explains the best ways to achieve the seamless integration of e-business initiatives

Q: What skills should individuals working on an integration project possess?

A: The necessary skills can be broken into two categories: business and technical. On the business side, you need individuals who understand your business applications, business processes and the overall business problems associated with them. We call them Domain Experts. On the technical side, it is essential that the individuals understand the infrastructure, available integration solutions and overall B2B processes.

Q: Clearly, a company's overall e-business strategy is directed by its business strategy rather than a specific technology. Therefore strategies can vary widely. What are the first things to consider when examining e-business needs for an organization with little or no existing e-business infrastructure or strategy?

A: I think it's extraordinary that many of the questions posed to me have been related to how a company should evaluate its e-business strategy. That's an extremely telling question. It indi-



cates that many companies have spent the past year taking a "wait and see" approach, which in hindsight may have been smart. But it's definitely time to begin formulating and implementing your e-business strategies. When considering a particular strategy, ask yourself what you are trying to accomplish. If the goal is somewhat nebulous, such as increasing sales revenue, then you may find it difficult to accurately assess the success and feasibility of this e-business deployment. However, cost reduction is a goal that can easily be measured and justified by an e-business implementation. As an example, consider Covisint. This B2B automotive trading exchange calculates an almost immediate ROI by implementing Commerce One to connect automakers with a network of more than 30,000 suppliers, thus increasing supply chain efficiency and drastically lowering production costs. If you're in that industry, that's an easy decision to make.

ILLUSTRATION BY RON CHAN



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Ask the Expert

Q: It's amazing to learn how many large organizations are late to the Internet and are just now planning e-business initiatives. Fortune 500 companies tend to put together an e-business committee comprising a variety of people with a variety of disciplines, and it's my experience that these huge undertakings usually get off on the wrong foot. The e-team is handed the keys to the Holy Internet Grail and told to "go do it" typically without having the benefit of any real experience. From that perspective, where would you advise a company to begin for the greatest chance of speedy success?

A: One of the biggest mistakes businesses can make when adopting an e-business strategy is to go for a "blue sky" or "big picture" view of what they're looking for. Narrow that

to staff up or retrain? Don't underestimate the cost of re-training and implementing a new infrastructure. And throw out any vendor that suggests its software is the tool on which you build your business processes. You need to leverage your existing IT infrastructure instead of starting from scratch. While starting from scratch might seem the cleaner solution, it's totally impractical.

Q: My company is a Fortune 100 multinational, and I am in charge of e-business. We have had varying levels of success with third-party vendors, but I never felt that any of them "got" our industry or company direction. What criteria should I be looking for when I evaluate e-business integrators?

A: The best way to measure the track record of e-business integrators is to probe. Ask them what their success rate is in your field. Ask them to identify successful projects similar to yours. Insist on talking to references for those projects. If they can show a high success rate, then chances are they have the capability of understanding your business critical processes and can provide

Demand integration solutions that are future proof, scalable and guarantee delivery of information in a real-time environment.

view down by looking at business processes in specific departments of your organization, and use these to assess and gauge the problems that need to be solved. Do you need real-time communication with your suppliers online? Do you need speedier response time to technical support cases submitted over the Web? Apply a solution to the pending issues in your test-case environments, then measure the success of this implementation. Only after you have gathered metrics and assessed the success rate should you roll out a broader companywide e-business solution.

Consider three key areas that will significantly minimize your risk: performance, cost and hands-on experience.

A big performance pitfall is choosing a solution that tops out in capacity after only a few months. Avoid this by choosing solutions that allow you to control scalability and latency.

And because your company—no matter what your business—has customers to please, consider the integration's latency needs before you worry about throughput. On the cost side, make sure you determine the true cost of the solution. Will you have

a solution to your integration challenges. The old cliché "The only stupid question is the one you don't ask" is all too true in this scenario. Demand integration solutions that are future proof, scalable and guarantee delivery of information in a real-time environment.

Q: How important is real-time data availability to the success or failure of an e-business strategy? Second, if it is so important, then do you believe that traditional enterprise application integration (EAI) architectures successfully satisfy this requirement for real-time?

A: Real-time delivery is absolutely essential to a successful e-business strategy. Think of the difference between the websites of supplier A, which offers online price, availability and purchasing of their products, and supplier B, which offers a picture of the product and a toll-free number to call to place an order. The bottom line is that if you can't deliver the product now, someone else will. Traditional EAI's do not successfully satisfy this real-time requirement as they are fundamentally asynchronous, slow and built for centralization of process integration. That means they are not particularly built for speedy responses or any type of personalization. **CIO**

To recommend an expert for this column or suggest a topic, contact Senior Editor Daintry Duffy at dduffy@cio.com.

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With a Little Help from Your Friends

If you want to succeed as a leader, make sure you have a first-class leadership network

BY CHRISTOPHER HOENIG

NO LEADER SUCCEEDS ALONE. Successful leaders excel when they are embedded in a network of other leaders, so it's crucial to establish those connections. Your leadership network should include the people you recruit for your teams and the ones you turn to for help; they're the people you look up to as well as the ones you are developing as the next generation. They are the people who will spread the word, for good or ill, about your caliber as a leader.

So how do you build a first-class leadership network? Here are the best lessons I've learned.

The Players

In deciding whom to include in your leadership network, be selective and think across many different dimensions. The goal is to create a partnership of like minds, a set of concentric circles that gradually expand to create your network.

Soul mates and storytellers. Start with the people you are closest to—the ones who know your spirit, your struggles, strengths and successes. You may have only a few soul mates in your life. When you find one, hang on to him at all costs.



Special versions of these are people who may not be like you but who appreciate you and your story. They are opinion leaders or journalists who are positioned to tell your story to people who matter. How do you know when you've found a soul mate? I know when I start telling my wife, the person I'm closest to, about someone new I've met.

Mentors and protégés. Mentors create opportunities as well as provide coaching and support. Protégés help you accomplish goals and also reinforce your own leadership lessons. Your relationships with these leaders are long-term, mutual commitments based on push and pull, seek and guide, explore and achieve, protect and support.

Peers and colleagues. Develop relationships with colleagues inside your organization and peers outside it. Facing similar challenges in life or career creates a bond and a sense of camaraderie, as well as a high likelihood that something you learn

ILLUSTRATION BY CHRISTOPH HITZ

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Total Leadership

will be valuable to them and vice versa. In building my peer network, I look for diverse leaders who work in different sectors or professions. I find this enriches my base of intellectual capital tremendously.

Heroes and legends. Great leaders know their heroes and legends. These are the people you model yourself after. You don't have to be adept at channeling to take advantage of their spirit and expertise. Follow their writings. Read their bios. Absorb the patterns of their lives. Assess their decision making. Learn from

Be attuned to the styles and sensibilities that show respect, and demonstrate that you can earn it.

their problem-solving approaches. One of my favorite mentors distinguishes himself in many ways, but the most interesting is the first question he asks anyone new that he meets: "Who are your heroes and why?"

The Setting

Where you build your network involves combining the most superficial networking events with hands-on collaborative projects. The deeper your joint experiences, the richer and more substantive your network will be.

Projects and partnerships. When you meet people you admire as leaders and see a chance to do business with them, jump at the opportunity. There's no better way to learn and to build your network. The first time I tried this I ultimately became business partners with the person, and we've been working together for more than a decade.

Panels and boards. Independent panels and boards demand both leadership and the ability to assess and develop other leaders. They also tend to deal with challenging issues. As such, they are the perfect environment for assessing the depth of character and competence of people you are working with.

Publications and presentations. In most professions and leadership roles, formulating and communicating points of view—whether through publications or presentations—is an important part of the job. Sharing intellectual capital is a potent means of developing a relationship and getting to know how someone thinks. I've met and developed bonds with some of the most important members of my leadership network simply by being on panel discussions together.

Personal and professional events. Whether an elite professional conference or a personal social event brings you together with other leaders, these classic networking opportunities are vital for making the acquaintances that can lead to deeper

relationships in the future. By participating regularly, you'll expand your circle of potential fellow leaders.

The Method

Building and nurturing a network is a constant process of give and take, investing and gaining rewards.

Bestow and earn respect. Leaders have a finely honed respect for humanity. British Petroleum's Sir John Brown looks for the three H's in his leaders: humanity, humility and humor.

Successful leaders have also worked hard to earn respect themselves. So be attuned to the styles and sensibilities that show respect, and demonstrate that you can earn it. This ranges from simple things like the ability to listen to showing a touch of class in how you communicate or present yourself.

Ask and offer. Tip O'Neill used to say that you never get anywhere in life without asking.

For political leaders, it means asking for money and votes. For business leaders, it means asking for favors, investment and work. It also means being willing to offer these in return. If you meet someone who captures your imagination, get to know them well enough to judge what might help them and then offer something that could really make a difference. Invest in the relationship. The worst that can happen is that they say no.

Teach and learn. It's vital to recognize the areas in which you can learn from others and develop a point of view that allows you to teach, whether via stories, modeling, explaining or questioning. Once you show the ability to both teach and learn, the bonds start to build. Many leaders I know even have e-mail distribution networks so that when they want to pass something interesting along they can send it to everyone in their network at once.

Sow and reap. Part of building great relationships involves recognizing that there are times in life, careers and relationships when you want to invest and give without expecting anything in return. There are also times—such as crises or great opportunities—when you should focus on reaping the returns of what you have sown.

If you target the right people and build your leadership network in the right places and the right ways, it can become the greatest asset you have—besides yourself. **CIO**

How do you nurture your leadership network? Let us know at leadership@cio.com. Christopher Hoenig has been an entrepreneur, government executive (director for information management and technology issues at the GAO), consultant (McKinsey & Co.) and inventor, and he is the author of *The Problem Solving Journey: Your Guide to Making Decisions and Getting Results* (Perseus Publishing, 2000). He is now chairman and CEO of Exolve in Washington, D.C.



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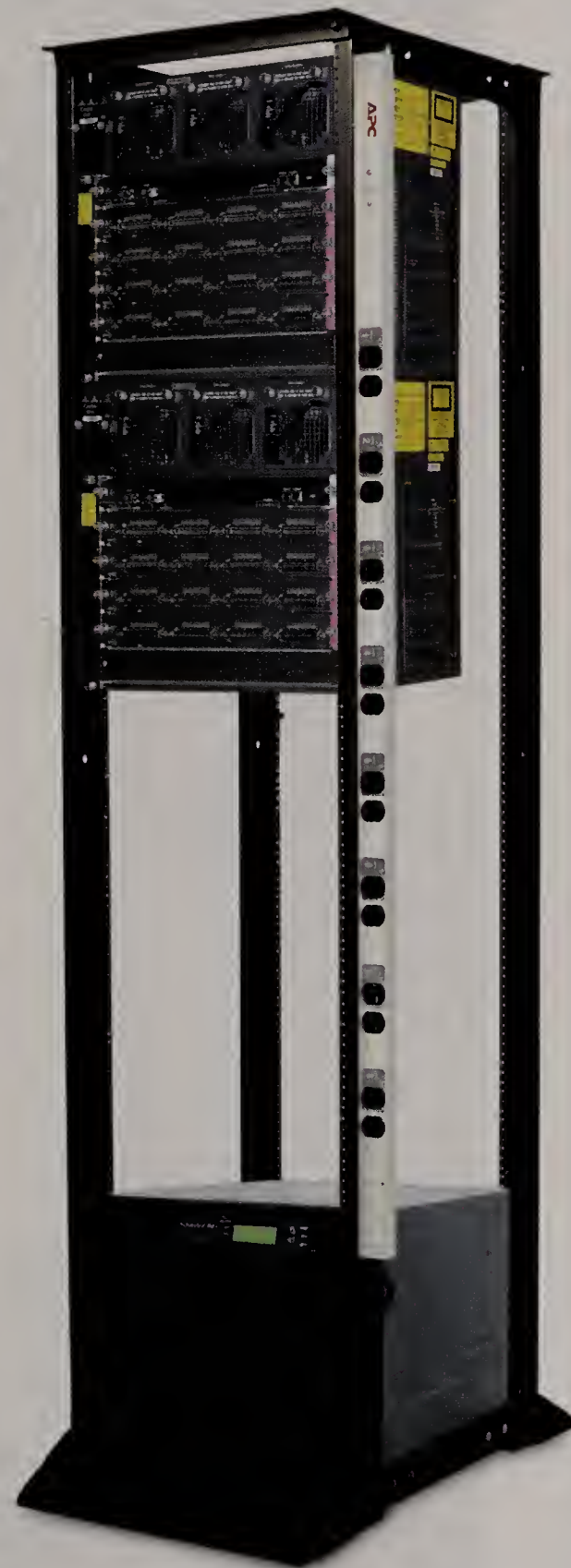
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$$T = K \sum$$

$$1/\mu \cdot R$$

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$$1/\mu \cdot C_i + 1$$

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$$(\lambda_i/\mu \cdot C_i)$$

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2

PROCEDURE YIELDS THE FOLLOWING EQUATION FOR CAPACITY

$$T = \frac{1}{\mu} + \left(\frac{D_e}{d_i} \right) \frac{\sqrt{\lambda_i d_i}}{\sum \sqrt{\lambda_j d_j}} \quad (12)$$

WHERE

$$D_e = D - \sum \frac{\lambda_i d_i}{\mu} > 0 \quad (13)$$

IF WE SUBSTITUTE THIS RESULT BACK INTO THE EQUATION (12) WE OBTAIN THAT THE PERFORMANCE MEASURE FOR A CHANNEL CAPACITY ASSIGNMENT

$$T = \frac{1}{\mu} \left(\sum \sqrt{\lambda_i d_i} \right)$$

WHERE

$$\frac{\sum \lambda_i}{\gamma} \quad \text{CHANNEL LENGTH (15)}$$

THE RESULT IS REFERRED TO AS THE SQUARE OF THE CHANNEL CAPACITY ASSIGNMENT; THIS PARTIAL FIRST PROVIDES TO EACH CHANNEL A LENGTH EQUAL TO λ_i/μ WHICH IS MERELY THE RATE WHICH MUST PASS OVER THAT CHANNEL IT MUST OBVIOUSLY BE PROVIDED

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A BRIEF HISTORY



In 1969, BBN was hired by the U.S. government to develop the ARPAnet, the forerunner of the Internet.



INTERNETWORKING

In 1997, BBN was acquired by GTE, the company that created our high-speed, 17,500-mile, Tier 1, fiber-optic network.

GENUITY™

In 2000, GTE Internetworking became an independent company, renaming itself Genuity. Today, we offer a vast array of managed Internet services, including *Black Rocket*.™

GENUITY™

PASSPORT

GLOBAL BUSINESS

Edited by Contributing Editor Malcolm Wheatley. Send your views and ideas on global business to him at passport@cio.com.



Ikea's Ulrika Martensson brought in a Global Standardized Financial System on schedule.

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Ikea's Financial Furnishings

The global furniture retailer found that its new financial system came with some assembly required **BY MALCOLM WHEATLEY**

GLOBAL BUSINESSES DEMAND GLOBAL FINANCIAL systems—an inescapable conclusion for most international companies, and one that furniture retailer Ikea came to grips with in late 1996 as Y2K and euro compliance deadlines loomed. Because Ikea has stores in 33 countries, 1,960 suppliers in 53 countries, and 36 purchasing offices in 29 countries, executives realized that the company's existing systems weren't up to the challenge.

Some countries were using a legacy Swedish system, some were relying on a very old version of

Computer Associates' Masterpiece system, and others were relying on a vintage U.S. system, explains the company's Helsingborg, Sweden-based CIO, Roger Neckelius.

In addition, although Ikea couldn't put a figure on it, the company had recognized that the cost of ownership of common systems worldwide was markedly lower. So the call went out for a single replacement system to implement globally. The answer came, but Ikea found that implementation was not without challenges.

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The search for the new system had several parameters, says Neckelius. "First, we wanted a financial system that would be the same worldwide. Second, we wanted a system that could grow with us. And we knew we couldn't delay too long; we needed something that could not only handle the euro but would also address the Y2K problems." In mid-1998, Ikea settled on Coda-Financials from Harrogate, U.K.-based Coda. Implementation fell to Ikea Project Manager Ulrika Martensson, whose background in software implementation for Computer Associates and a Swedish software company led to her being recruited specially for the task. Her mission, assigned by a joint IT and finance steering committee reporting to Neckelius and Ikea's CFO, was to implement the system in 12 countries by Sept. 1, 1999, the start of fiscal 2000. The

12 countries were targeted because their lack of euro and Y2K compliancy was putting Ikea's business at risk. After that—and certainly by mid-2001—the goal was to

management activities are coordinated by Ikea International of Denmark. The ultimate owner, Ikea Group, is in turn owned by a Netherlands charitable foundation.

In retrospect, the team took too much advantage of the system's malleability. Given a second chance, "We'd go for a more fixed structure and say to people: 'Adapt to this.'"

—ULRIKA MARTENSSON, IKEA PROJECT MANAGER

implement the system in most of the rest of the world, at a pace that matched Ikea's growth rate. It was a mission that was to launch Martensson and her two-person team of Ikea accounting managers on a steep learning curve that would see them not only come to grips with quirky accounting conventions in far-off climes but also experience an ironic situation. Coda-Financials, it turned out, required a great deal of customer assembly, just like Ikea's own furniture products.

Martensson and her team, based in Zaventem, Belgium, close to Brussels, had to not only embrace this international potpourri but also cope with the different kinds of Ikea businesses within the overall company. They break down to three—retailers, wholesalers and service companies that take care of activities such as overseas sourcing, treasury functions and real estate. Wholesalers, for example, have significant flows of goods and multiple currencies, and they have relatively few invoices. Retailers, on the other hand, operate in one currency but have many more invoice transactions.

AT A GLANCE

Ikea

The Business: Ikea's concept of offering functional home furnishings at low prices is big business; revenues are 9.2 billion euros, equivalent to US\$9 billion. Since 1997, revenue growth has averaged 20 percent a year, and Ikea adds about one new store per month.

The Challenge: More than 50 years of higgledy-piggledy growth has carried a price—higgledy-piggledy financial systems.

The Solution: Coda-Financials, implemented in swift order by a global project team based in Belgium. The snag: a tight deadline—Y2K and the euro were around the corner.

This End Up

"We hadn't appreciated this [element of assembly] and thought that the system was much more predefined than it actually was," Martensson explains. "We weren't prepared for the degree of flexibility. In a traditional financial system, you know what the accounts payable are. In Coda, you're building a model of transaction that flows in and out of the company, and you have to first define everything—even the accounts payable."

The definition challenge was compounded by Ikea's convoluted corporate structure. Although Ikea was founded in Sweden in 1943, the Ikea concept is actually owned and managed by Netherlands-based Inter Ikea Systems. Ikea Sweden is responsible for the product range, while

Define and Conquer

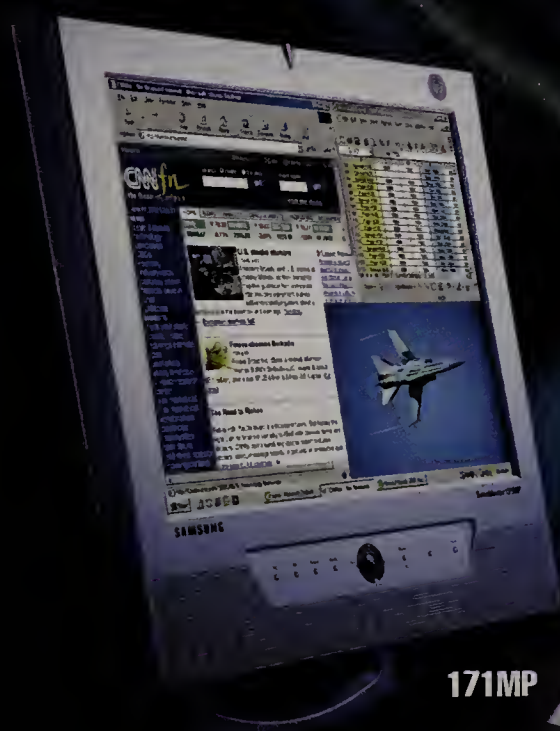
A recommendation from Coda at the outset of the project was to establish prototype definitions for each type of business in order to capture and codify the diversity. With hindsight, Martensson says, this strategy gave the project a huge head start—even though she admits to having initial reservations over whether individual Ikea businesses would accept any compromises. "We now realize that it saved time during the implementation, and it continues to save time," she says.

Ikea derived the prototype definitions by talking to users about their needs, and Martensson accordingly invested time in canvassing opinion from around Ikea as to

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what the system should deliver. In retrospect, she says, the team took too much advantage of the system's malleability, which offered its international users considerable flexibility. If she were given a second run at it, Martensson wouldn't repeat that mistake. "We'd go for a more fixed structure and say to people: 'Adapt to this,'" she says. "It would make the implementation much more efficient." It's hard to quantify the savings that would have achieved, but defining the rules took between five and 10 days for each implementation—an interval that wouldn't have been required with an "Adapt to this" policy.

Considering everything, progress wasn't that slow. Four months into the project, workable prototypes were in place for three businesses—a Spanish retail operation, a Belgian wholesale business and a small service company in Germany. They were the role models for the rest of the Ikea rollout. But even with the prototypes in place, hurdles emerged as the implementation date for switching over the 12 Western European countries edged closer. Foreign banks' automated payment systems varied widely, not just from country to country

Union], VAT is handled differently from country to country," warns Martensson. Off-the-shelf Coda-Financials, it turned out, could handle all the differences except the quirky Italian VAT system, for which a special add-on was required.

Nevertheless, all 12 countries, containing a mix of retail, wholesale and service companies, successfully went live by the target date of Sept. 1, 1999, sidestepping Y2K worries as well as euro concerns.

To begin with, in each type of company, the strategy was to manage transactions in national currencies and track them in euros. Accounting and financial reporting were switched over to euros for wholesale companies in the euro zone a year after implementation. And euro-zone retail operations will switch to euro accounting in September 2001. (See "Accounting for Euros" on this page for the lowdown on upcoming euro deadlines.)

Timing It Right

Another learning point, says Martensson, is to implement in the middle of the financial year—even though doing so at the beginning is theoretically cleaner from the sys-

**Implement in the middle of the financial year.
"At the beginning of the year, the accounting department is busy closing the books, and they don't want to learn a new system."**

—ULRIKA MARTENSSON, IKEA PROJECT MANAGER

but also from bank to bank. That diversity needed to be recognized and appropriate fixes put in place.

Another headache was Europe's value-added tax (VAT)—similar to U.S. sales tax but levied at each stage of the trading chain, including business-to-business transactions. "Even within the [European

tems point of view. "It's best to spread it out," she says. "At the beginning of the year, the accounting department is busy closing the books, and they don't want to learn a new system." The mid-year start date is not difficult, she adds. At the point of switch-over, the ledger balances are transferred and subsequent transactions

Accounting for Euros

On Jan. 1, 1999, 11 member states of the European Union adopted the euro as their "scriptural" currency—meaning that notes and coins wouldn't be available until later, and that existing national currencies would be used in the meantime. (Greece later became the 12th member.)

Euro banknotes and coins go into circulation Jan. 1, 2002, when national currencies will immediately start being withdrawn from use. Shopkeepers will accept national currencies but must give change in euros. On Feb. 28, 2002, just two months later, national currencies will become history.

recorded on the new system.

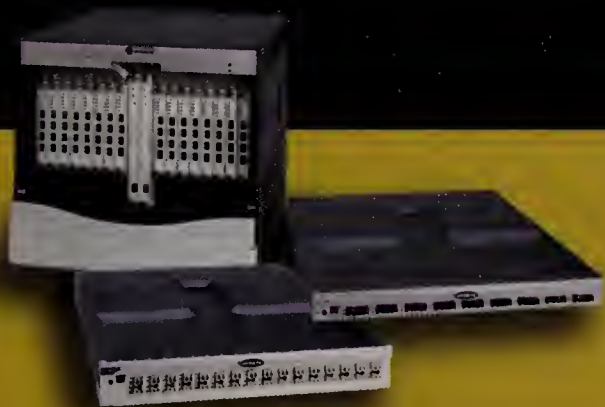
The drawback to this approach is that management accounts for that particular financial year are spread over two systems, necessitating a search through two lots of books if there is a query. But the obligation isn't especially onerous, says Martensson. The information held on the previous systems must in any case be kept for between five and 10 years, depending on the legal stipulations of the country involved.

By year-end, Martensson hopes that the last few countries will have switched over, or at least have timetables for the switch. It's basically a sweep-up operation, such as an implementation at a small trading office in Turkey, which buys goods on behalf of the wholesale companies. With that done, her frenetic travel schedule can at last start to wind down; so far, her team has visited 21 countries since the project began, with Martensson herself visiting 17.

"Australia—it's just too far. Coming back, it takes 30 hours," she says with a sigh. "Nice country, terrible trip." ■



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WORLDVIEW | DAVID DOBRIN

Where Is Wireless?

You'd think wireless leaders like Japan would have B2B apps. Think again.

B2B E-COMMERCE APPLICATIONS REMAIN scarce, even in the countries that should be leading the way.

In Japan, they're called the Thumb Tribe. You can see them on Tokyo's Hibiya subway line early in the morning: hunched over, staring toward their laps, madly punching Japanese characters into their cell phones with their thumbs. Come lunchtime, they're at it again—this time on the sidewalk, oblivious of passersby.

They're hooked up to I-Mode, Japanese telco DoCoMo's mobile Internet portal.

They're doing the sort of things you'd do on a portal when you have a two-hour commute on the subway—catching up on e-mail, checking a bank balance or playing games.

But are any of them working? Are they checking production schedules or responding to customer requests to change an order? If they are, it's only via e-mail. As far as I can tell, even in Japan, wireless apps are strictly for consumers.

It's a picture that is mirrored around the world. We have an acronym—B2B-W,

meaning wireless B2B e-commerce—but we don't have applications. You would think that at least the traditional world leaders in wireless penetration would have something. Following up on that logical hunch, I recently asked my contacts in Brazil, India, Japan, Sweden and England the same question: "What's going on with B2B-W?"

From Brazil, I heard "Nothing we know of." From Bombay, there was a similar answer. From Japan, "Just I-Mode." From Sweden, "Zilch."

In England, I was sure I would find something. I've worked for years with some of the British pub companies, and I figured a pub manager would like to use his Palm Pilot to place orders. Yet even there, despite plans I heard from one company to connect pub managers via a browser, there was nothing.

What About Us?

The same trawl didn't find much in the United States either. In Cambridge, Mass., Viridien Technologies recently built an application that allows doctors to answer market research questionnaires about treatment results using their wireless devices. Now, market research is not exactly core B2B e-commerce, but this is a good wireless application.

But can we do better than this? Maybe, but no one seems to feel the need. According to Len Tinkoff, chief marketing officer at Viridien, "Large companies are only beginning to think about establishing convergence between wireless and wireline."

Convergence, of course, is very much one of those flavor-of-the-day terms. For most companies that I've spoken to, it means merely pushing a version of their regular apps out to a wireless device. But convergence has to mean more than that. You don't want to use a wireless device to enter (or even to review) data in SAP. Not at rush hour, not on the Hibiya line. Not

An open letter to readers of CIO Magazine



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when you're using your thumbs. You want to wait until you're at the office.

You want to use a B2B-W application only when the balance of urgency against inconvenience merits it. Either the urgency is great—hence the existence of wireless trading applications—or the convenience is superior, as in my pub manager example.

Gotta Start Somewhere

Maybe companies will start with the ultimate in convenience: the fully automatic wireless application, such as a wireless device that broadcasts where a pallet is all the time. Right now, of course, most locator software uses older radio frequency technology, but you know that improvements in wireless are coming. Nonautomatic B2B-W ought to come more slowly because it seems that most such applications would have to be written especially for wireless. Otherwise, they'd be too inconvenient.

One global (but U.S.-based) consumer packaged goods company that I know of looks to be a good test case. Its IT folks are planning to build wireless applications that will allow owners of small convenience stores to use handheld devices to order their products, instead of phoning in or faxing orders. They'll start, they've said, with a region where wireless-based ordering offers significant cost or convenience advantages over landline communication—Brazil is currently at the head of the pack.

But will it work? It's a test case that deserves careful attention, if only because any outcome is sure to leave one party—either the company or the store owners—twiddling their thumbs. **CIO**

David Dobrin is president of B2B Analysts in Cambridge, Mass. His opinions have aired on highways and byways from São Paulo to Mumbai.



Q & A | JOSE BLEDA

Iberian Exchange

EUROPE'S IBERIAN peninsula—Spain and Portugal—is surprisingly large: approximately 371,000 square miles. It's surprisingly industrial too; manufacturing output as a percentage of GDP is 33 percent, ahead of Germany, Italy and France. And it's also a surprisingly popular tourist destination: 60 million vacationers flock to the region each year. Not to mention it's surprisingly tasty; the peninsula's exports of fresh produce and wine are found in supermarkets all over Europe. The result? A logistics headache that's ripe for an electronic transportation exchange with a difference, says Jose Bleda, a partner in the Barcelona, Spain, office of consultancy Accenture.



Q: What's the problem with Iberian logistics?

A: Imbalance. Industry and agriculture are in very specific areas, remote from their customers. And the tourists mostly go to the coastlines. Plus the sheer distance from the rest of Europe: Amsterdam is over a thousand miles from Barcelona. Almost everything has to be transported a long way—which is inefficient.

Q: Is there a solution?

A: The distance can't be shrunk, but the efficiency can be improved. Too many vehicles run full in one direction and then return empty. Agoratrans, which we and supply-chain-planning software company Manugistics helped to create in conjunction with equity partners from the industrial and retail sectors, aims to remedy that. It enables trucks to run full both ways. Trucks taking beer from brewery Damm to discount retailer Dia, for example, may return laden with roofing tiles or pipes. Agoratrans began operating in January and was achieving 200 truckloads a day within three months.

Q: But transportation exchanges are nothing new. We have them in the United States.

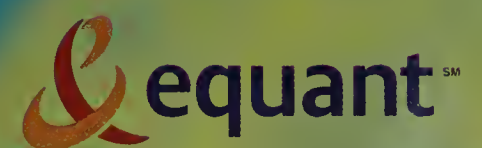
A: But not like this. It's not a public exchange, where anyone can post a load. It is a collection of private exchanges where carriers and shippers can interact using a single private-exchange view or a multiple exchange view. Every individual exchange has its own Agoratrans management team providing support.

It's a different business model—a cooperative venture among known and trusted partners, complete with load planning and electronic payment services. The whole transaction remains within the exchange.

—Malcolm Wheatley

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The Secrets of their Success

If your company's stock is heading south, if profits have vanished and systems are sunk, who you gonna call? At Waste Management, they called Maury Myers and Tom Smith, and now they're glad they did.

BY STEPHANIE OVERBY

WASTE MANAGEMENT WAS IN THE DUMPSTER.

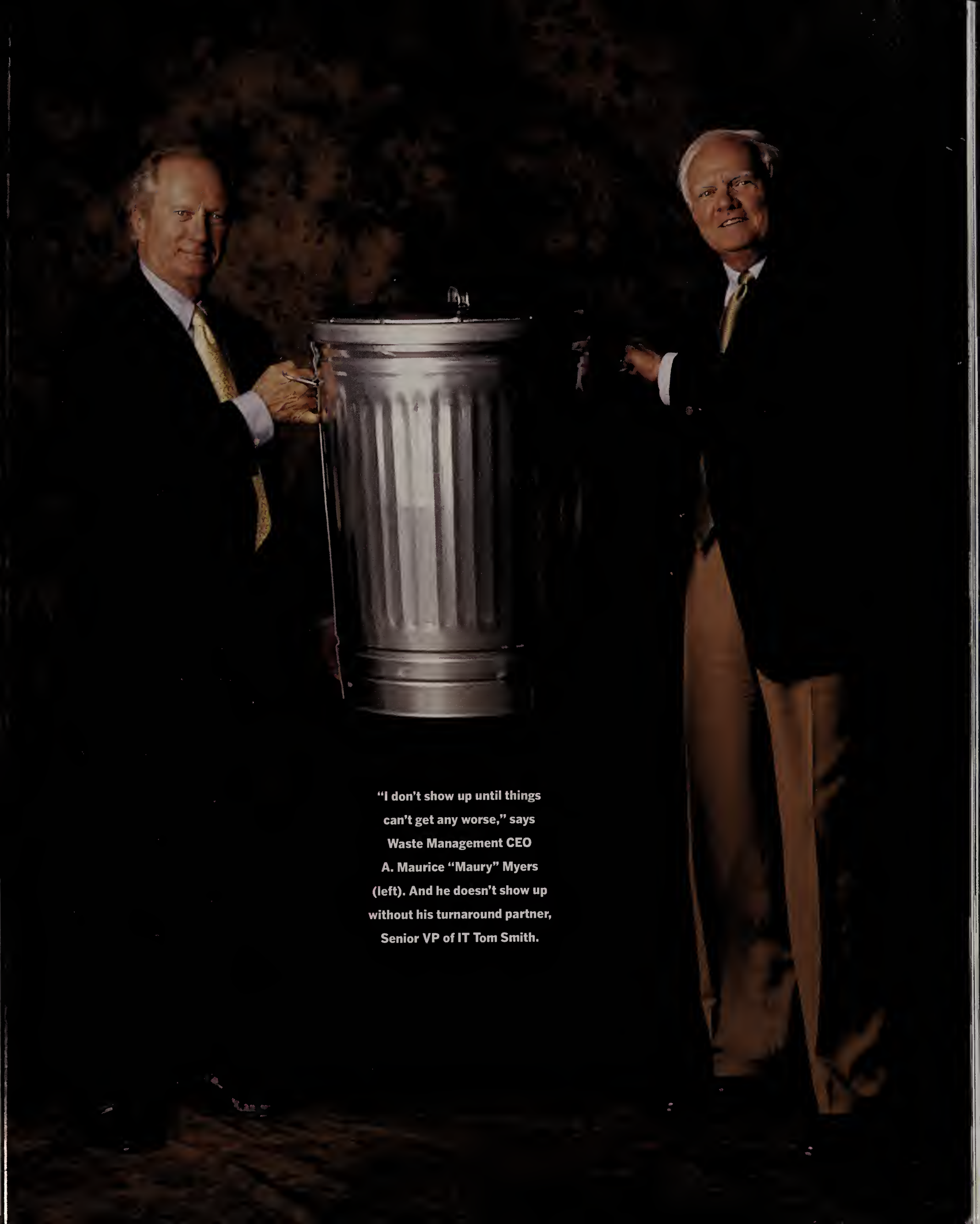
In early 1998, the largest trash hauler in the United States announced that it had overstated its 1992 to 1996 earnings by \$1.4 billion. That boo-boo forced the company to subtract \$1.1 billion from its ledgers and restate its earnings back to 1991.

After announcing its error, Waste Management was bought by USA Waste for \$26.6 billion in equity and debt, and moved from Oak Brook, Ill., to Houston. Long-suffering Waste Management shareholders were promised that the new, bigger corporate entity would save \$800 million through economies of scale, and the new company proceeded to chase those economies by acquiring garbage operations, throughout 1999 at a rate of one a day. The total eventually reached more than 1,500. But in July 1999, Waste Management delivered the first of several earnings disappointments, falling short of revenue projections by \$250 million for the second quarter. Upon issuing the earnings warning, the stock plummeted 37 percent on July 7, 1999. Waste eventually lost more than \$20 billion in shareholder value, represented by the difference between its May 3, 1999, stock price of \$58 (just after its acquisition by USA Waste) and its \$14 low on Dec. 20, 1999.

Then the Securities and Exchange Commission (SEC) launched an inquiry into the circumstances that allowed 13 insiders to dump more than a million

Reader ROI

- Find out how this team plans to heal an ailing \$12.5 billion company
- Discover why this CEO and his IT guy are the ideal turnaround pair
- Learn the rules of turnaround management



**"I don't show up until things
can't get any worse," says
Waste Management CEO
A. Maurice "Maury" Myers
(left). And he doesn't show up
without his turnaround partner,
Senior VP of IT Tom Smith.**

shares of Waste Management stock two months before the July 7 price drop. A truckload of shareholder lawsuits followed, which Waste Management eventually settled for \$220 million.

In August 1999, the company's fifth CEO in three years, John Drury, was diagnosed with brain cancer and stepped down. The board then ousted President and COO Rod Proto. Turnaround expert Robert Miller, former SEC Chairman Robert Hills and shareholder activist Ralph V. Whitworth, all on Waste's board, took the wheel and did just what Yellow Corp. and America West Airlines—both companies that had teetered on the edge of the abyss—had done before.

They called A. Maurice "Maury" Myers.

Whitworth wanted a CEO with solid turnaround experience, an understanding of asset-rich companies and a knowledge of IT systems. That was Myers. Whitworth had watched him bring Kansas City, Kan.-based Yellow Corp.—which had lost \$61 million

between 1993 and 1996—back into the black and in just three years turn the 76-year-old trucking company into a high-tech leader.

A little negotiating, an \$850,000 salary and a bonus that would amount to more than \$1 million by the end of 2000 brought Myers aboard in November 1999.

"I don't show up until things can't get any worse," the soft-spoken 61-year-old says with a chuckle.

And he doesn't show up without Tom Smith. Before accepting the garbage gig, Myers called Smith, then president of Yellow Technologies, the subsidiary that provides IT support across Yellow Corp.

"He said, 'I'm leaving, and I'd like you to go with me,'" Smith recalls. "And I said, 'Fine. Where are we going?'"

Myers explained the situation at Waste Management. "At that point, I decided I'd better call my wife and tell her to think about moving," adds the white-haired, 62-

The 7-Point Path to Turnaround Enlightenment

1. Get out of the office.
2. Stop the bleeding.
3. Find your biggest problem and fix it pronto.
4. Conduct customer surveys.
5. Find out where the profits are.
6. Talk the talk.
7. Base IT investments on ROI.

year-old Smith, who had just sold his home and was on the verge of closing on another. He was thinking about golfing and traveling. Instead, he rerouted the moving trucks to Houston and arrived there two weeks after Myers in November 1999.

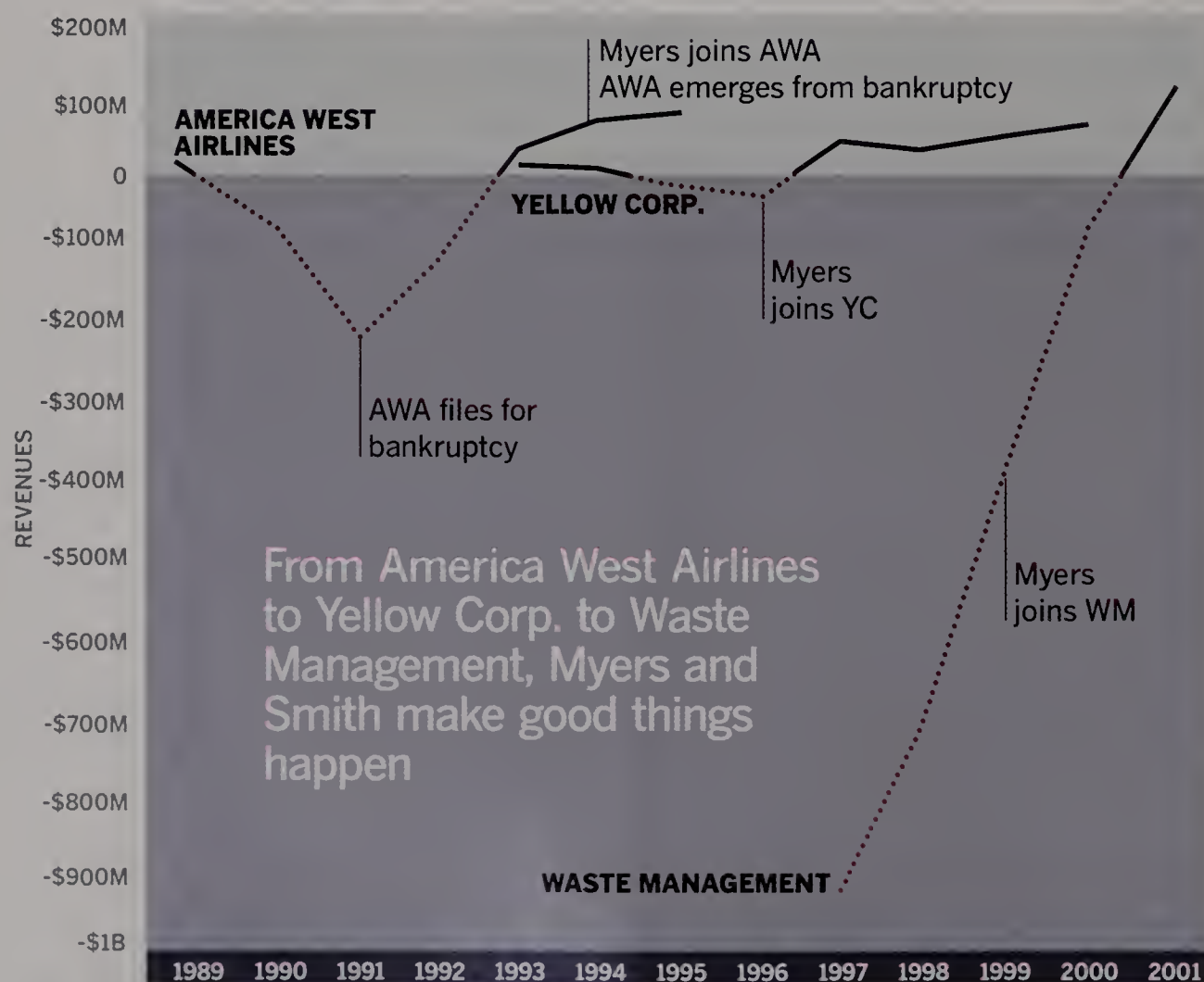
TEAM TURNAROUND

The Myers-Smith partnership is "probably one of the marriages between a CEO and a CIO that works best in America today," says John Ogrizovich, Waste Management's vice president of IT services, who has known Smith since the two worked together at United Telecom, now Sprint, a quarter of a century ago. "Maury knows where they need to go, and Tom is able to steer in that direction."

Myers and Smith met when Myers joined the bankrupt Tempe, Ariz.-based America West Airlines as president and COO in 1994. Smith had been at the helm of the airline's IT department since 1989. "The company was in a state of chaos, and the only department that was functioning well and whose leader was respected was IT," Myers recalls. "I thought, Jeez, this guy must know what he's doing."

Myers would eventually leave America West Airlines but not before seeing the airline that lost \$222 million in 1991, when it declared bankruptcy, announce a record profit of \$53.8 million in 1995. Myers was so impressed with Smith that when Myers left in 1996 to work his turnaround magic at

The Trail of Team Turnaround





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Yellow Corp., he hired Smith as president of Yellow Technologies. The trucking company, which lost a total of \$38 million in 1994 and 1995, recorded profits of \$52.7 million in 1997 after about a year of the Myers-Smith magic. Today, the company is seeing its best results in 76 years (\$69.3 million in profits in 2000). According to current Yellow Corp. Chairman, President and CEO Bill Zollars, that's largely due to strategy and systems put in place by Myers and Smith.

They attribute their success less to hocus-pocus than to repetition. "It's funny. The same issues crop up everywhere we go," Myers says. Specifically at America West Airlines, Yellow and Waste Management, the duo found companies with a lack of reliable information with which to set goals and measure progress. This led to Myers' first

Myers' First Rule:

"If you can't measure it, you can't manage it."

rule of turnaround management: "If you can't measure it, you can't manage it."

While at the three companies, Myers and Smith developed their Tao of the Turnaround, and it's based on what they believe to be a fundamental business truth and the corollary to Myers' first rule: "He who has the best information always wins."

It's easy to see why they complement each other so well. Myers is a strategist with a deeply rooted respect for technology. Smith

is a technologist with a deep understanding of business strategy. Here's how they are applying their protocols to what is the duo's biggest turnaround challenge to date.

THE TAO OF THE TURNAROUND

Get out of the office. In every turnaround situation, Myers spends his first two to three weeks in the field. "When I arrived here in Houston, Maury introduced me and then took off," Smith says. "He did the same thing at Yellow."

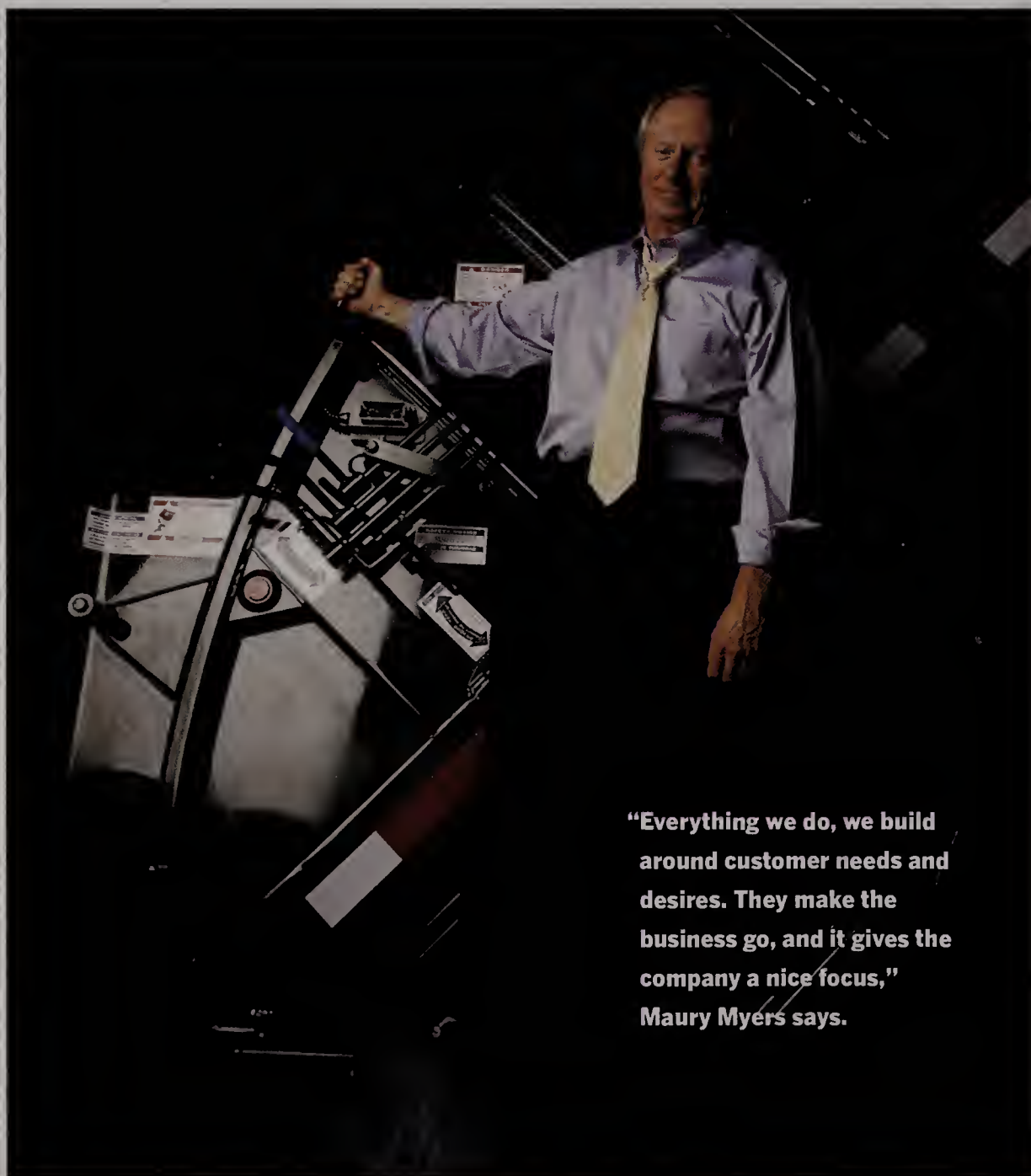
During November and December 1999, Myers traveled coast to coast doing the hard work of what Smith calls "hugging garbage-men," often getting up at 2:30 a.m. to meet drivers before they started their day's routes. Smith did the same—visiting operating locations, landfills and transfer facilities—upon Myers' return.

The tours give employees the chance to meet—and be impressed by—the new guys in charge.

But the trips were more than PR missions. Going onsite with your employees is the best way to understand a new business. As Smith says, the extent of his environmental services knowledge when he got to Waste Management Airlines was limited to the fact that "I had a garbageman."

Smith explains, "The last place you're going to learn about how a business works is at corporate headquarters. Nothing beats working with a teamster on the dock. They'll say, 'You're from corporate. Let me tell you what my problems are.'"

Both Myers and Smith recall hearing a telling story from one of the company's regional controllers. "She had a fairly simple accounting application she had to run, but she would have to start the process before



"Everything we do, we build around customer needs and desires. They make the business go, and it gives the company a nice focus," Maury Myers says.

she went home for the night so it would be done when she came in the next day," Myers says. So Myers and Smith knew the company's 400 AS/400s would have to be replaced with speedier machines. They also could see that Waste was in dire need of an ERP system to handle financial information.

Myers believes that these fact-finding missions are critical. In fact, even after nearly two years on the job, he still spends about half of his time on the road.

Stop the bleeding. In September 1999, a third quarter that will live in infamy for "old Waste" as it is called (the company would miss its original earnings projection by \$160 million), the chief accounting officer was desperately trying to close the books when the network went down. "He said, 'Can you help me?'" recalls Mike Clarke, now the vice president of systems development, then the senior director of the accounting service center, who had worked on the finance side of the company for 12 years. "I said, 'I think if we can get in [to the server room], we can reboot the machine.' But the door was locked. He says to me, 'Kick it down!'" The door held, but Clarke found a cleaning lady who let him in. Then he had to call offsite support personnel to get the passwords. Then he was able to reboot the machine.

Not a system one would want to preserve. But as much as Smith wanted to load Waste Management's legacy systems onto one of their newly painted green and yellow trucks and send them to the nearest landfill, he knew he wouldn't be able to do that for some time. "System stabilization is important to enable the organization to operate effectively while plans are put in place for the future systems," explains Smith. "Without it, we would have found ourselves continuously fighting fires and not addressing the long-term system needs of the business." The same was true at Yellow and at America West Airlines, where new systems were put entirely on hold during the company's Chapter 11 years. Waste Management will continue running on its legacy financial sys-

ERP, SCM, CRM, and Then Comes the Money

How Maury Myers and Tom Smith plan to clean up Waste Management

When CEO A. Maurice "Maury" Myers and Senior Vice President of IT Tom Smith arrived at Waste Management in November 1999, they knew they wanted to transform the strategy of the company from one focused on acquisition and rollouts to one centered on operational excellence. In order to inculcate discipline and accountability throughout the company, the turnaround team outlined four initiatives early on for the ailing company. Here's how they're progressing as of the middle of 2001.

ERP Myers and Smith plan to launch PeopleSoft financial, HR and customer information systems companywide. More than 400 of Waste Management's districts were up and running on the PeopleSoft financial systems as of July 2001, and the company plans to convert all 1,500 districts by the end of the year.

tem until year's end, but it took a lot of time and money to stabilize them.

Getting rid of the legacy systems lickety-split was impractical, and probably impossible, but getting them to work better was doable. And the man for that job was Vice President of IT Ogrizovich.

Ogrizovich had heard that Myers was

Supply Chain Myers and Smith are attempting to leverage Waste Management's size and its \$4 billion annual procurement budget (everything from trucks to paper clips to travel services) by consolidating purchases, paring down suppliers and taking all procurement online. The company expects procurement savings of \$75 million by the end of 2001 and eventually \$400 million annually after a few years.

CRM The goal is to make Waste Management a true "service machine" by creating enterprisewide rules and standards for customer relations. Three service machine program pilots were running in June 2001, from which the company will build a blueprint for the companywide rollout later in 2001. Each business unit will then have a template for customer setup, on-time service requirements and customer-handling protocols.

Overall Market Strategy

The plan is to adjust pricing based on location and competition, and maintain the focus on the strongest core North American business units, leveraging locations in which the company owns collection, transfer station and disposal businesses in order to make the company more profitable. Waste Management has already sold its overseas assets and has raised some landfill prices. The company expects \$75 million in benefits from this initiative in the second half of 2001. —S.O.

coming to Waste Management and knew his old colleague from United Telecom wouldn't be far behind. He gave Smith a call and asked if he needed help. He did. So Ogrizovich left his job as vice president and general manager in the Houston office of The Harbour Group, an IT consultancy, to become Waste's new vice president of IT serv-

ices in January 2000. His immediate task was to build an IT infrastructure, including the \$3 million, 12,000-square-foot corporate data center at the Houston headquarters. "Things were so bad that we didn't even say we were going to go from chaos to stability," Ogrizovich says. "We said we wanted to go from chaos to unreliability."

Ogrizovich exceeded those expectations. He built the data center and bought new equipment. Now, thanks to three enterprise-class AS/400 servers (which have more processing power than the 400 old individual units combined) into which all local operating units are now networked, some of the legacy financial applications that once took eight hours now run in three minutes. The center also contains 20 Unix servers, 170 Windows NT servers and 6 terabytes of drive space. And one no longer needs to kick down the door to get in; all one needs is an access badge.

Identify your biggest problem and fix it pronto. When Myers and Smith began to make changes at Waste Management, "it was anything but by the book," Smith says. Forget about building a business case, determining ROI or even getting a blessing from the board in order to fix an urgent problem. In a turnaround situation, certain things must be done yesterday. At Waste Management, the company was notorious for needing an army of 1,100 auditors just to close its books. From overstated earnings to revenue shortfalls, unreliable financial information was the hallmark of the old Waste. And much of the bookkeeping at the individual business units was done manually. "If one district wanted to charge another district for something, rather than using a financial application to do it, they'd have to call them up and say, 'I'm putting this on my book, you record the offset on your book,'" recalls Waste veteran Clarke. "It was horrendous."

So in April 2000, Smith decided that rolling out the PeopleSoft financial system enterprisewide, which he had also done at Yellow in the early stages of its turnaround, was imperative.

"When we made the decision to go with new financial software, there was no cost justification. We just knew we had to have them," Smith explains. He and Clarke decided to install a pilot program at the company's Colorado Springs operation by December 2000.

"We were in such paralysis as a company that no one had ever wanted to make a decision. So we just decided we were going to do this and guessed at a date for the pilot," Clarke says.

Myers' Corollary to the First Rule: "He who has the best information always wins."

"I didn't know if we could do it," Smith adds. "But if you don't have a target, you'll never get there."

Smith and Clarke beat their deadline and came in slightly under their \$70 million budget with the PeopleSoft pilot, which includes general ledger, asset management and accounts payable functionality. By May, 200 of the company's Midwest area districts were running the new financial systems, and Smith expects to speed up the rollout and finish all 1,500 conversions by the end of 2001. At that point, they will be able to look at expenses, such as maintenance, on a companywide basis in order to manage them ("If you can't measure it, you can't manage it") and set budgets more effectively.

Not to mention close the books.

Conduct customer surveys. If there's anything as important to Myers and Smith as having the best information ("He who

has the best information always wins"), it's satisfying customers. "Everything we do, we build around customer needs and desires. They make the business go, and it gives the company a nice focus," Myers says. At Waste Management, there was a 12 percent churn rate among commercial customers, costing the company millions of dollars.

So Myers did what he always does—conduct customer surveys.

At Waste Management, it was a Herculean task; the company has 25 million resi-

dential customers and 2 million corporate clients. In June 2000, Myers hired McKinsey & Co. to do a targeted survey. It revealed that the number-one customer concern was not timely pickups or prices. It was billing.

"They wanted us to post their payments properly and stop calling them for payments they'd already made," Myers says. Thus, a new billing system became a top priority.

Myers also found that poor service—missed pickups or failure to resolve a customer complaint—was what most often motivated customers to switch garbage companies. That inspired Myers and Smith to create the "service machine" initiative—an attempt to create a consistent approach to customer service throughout the company, focusing on new customer setups, on-time service and customer handling.

Figure out where the profits are. When America West Airlines was working to emerge from bankruptcy during the early 1990s, the company had to reduce fleet size and routes. In order to help executives do so smartly, Smith built software to find out which routes and times were making money and which were losing money so that airline executives could figure out which routes to keep and which to shuck. In 1998, when

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Smith joined Myers at Yellow, Smith quickly built a system in Cobol called Prism that could look at the trucking company's profitability from all levels.

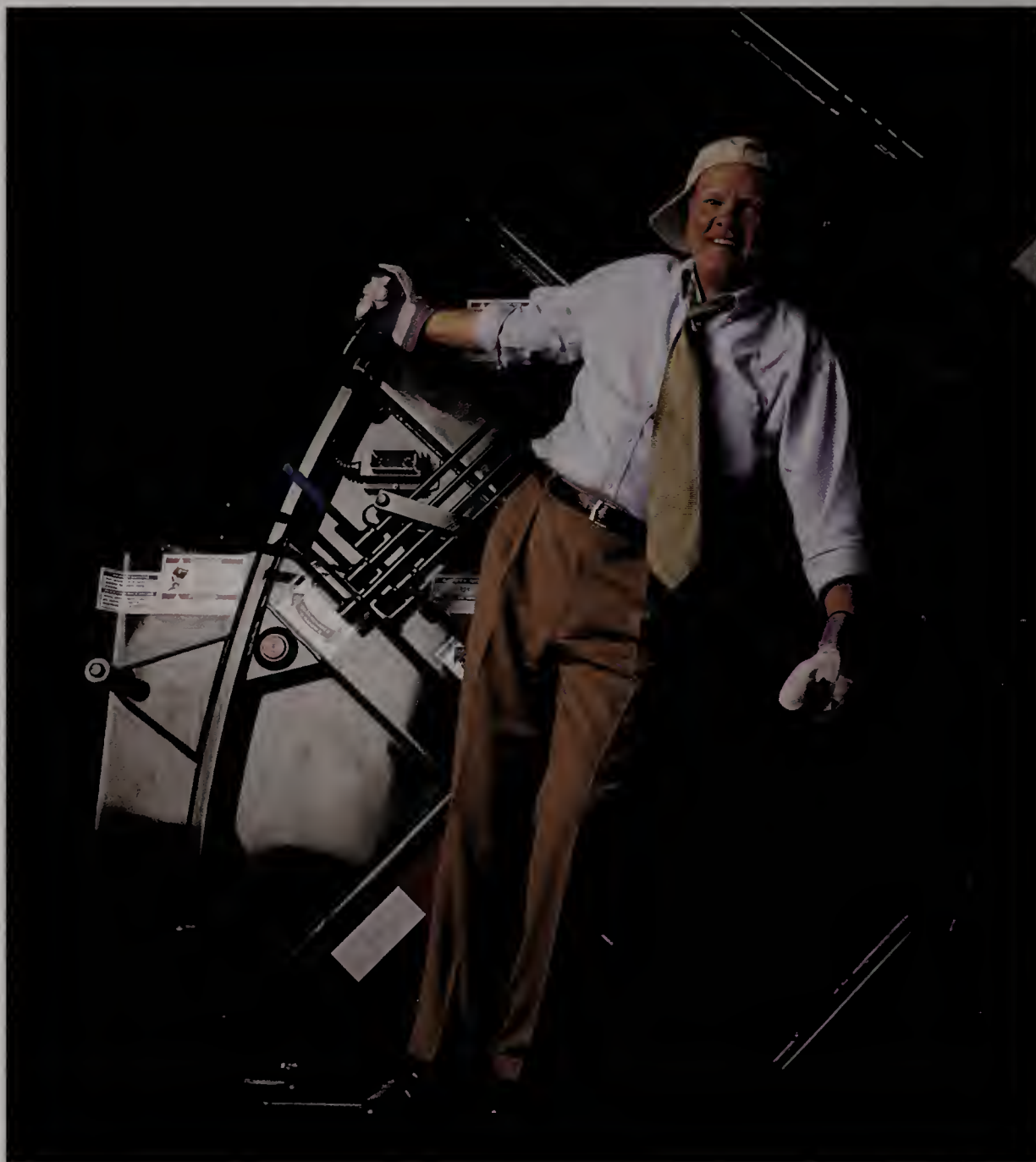
"We had a lot of data but not a lot of information," explains current Yellow CEO Zollars, who was president of Yellow Freight, a Yellow Corp. subsidiary, during the Myers-Smith reign. "Tom developed a system that allows us to determine the profitability of each shipment, then the profitability of each customer, then each industry and so on." Though the technology platform has been different at each business Myers has run, the principle has remained the same.

"So guess what Maury says when I walk in the door here?" Smith asks rhetorically. "Tom," he says, 'we need to be thinking about a profitability system.'"

In July 2000, Smith and Vice President of E-Business Griff Macy created a temporary intranet-based profitability program to track operational metrics so that business units could begin to determine which customers they were losing money on, and either adjust prices or even walk away from the unprofitable business. In the next year, Smith will roll out the PeopleSoft enterprise performance module to provide even more granular profitability information.

Talk the talk. Once the IT systems were stabilized at Waste Management, Myers held one of his famous leadership conferences, a kind of corporate pep rally for company managers. In April 2000, Waste Management's leaders gathered 1,700 strong at the Mandalay Bay Resort and Casino in Las Vegas to hear what Myers, Smith and their senior management team had done and what they were planning to do. The high point of the conference was when Myers, wearing a tear-away garbage-man's uniform over his button-down shirt and trousers, rode into the huge conference room in a Waste Management truck. He received a standing ovation.

"I mean these are down and dirty garbage-men. And you start to hear this rumble: 'It's Maury. It's Maury.' And all of a sudden



"The last place you're going to learn about how a business works is at corporate headquarters."

—TOM SMITH

they're all on their feet, standing on their seats and clapping," Clarke says. "I've been here 16 years, and I've never seen that before."

Managers attended workshops on the company's key initiatives and tried out new IT tools at 25 booths—everything from the PeopleSoft ERP system to route tracking and maintenance software. At Waste Management, employees had always had management, but it had been a long time since they'd seen leadership.

The purpose of the conferences goes beyond giving employees a new, more positive perspective on the company. Myers finds

that they help to ease employees into the new systems and processes he and Smith introduce. "Getting people to change their view of how to do something is often more difficult than implementing the mechanical change," Myers says. "Communication is the key to getting people's confidence."

Myers' other communication efforts include starting a weekly Waste Management newsletter, *WM Monday* (in English and Spanish), that updates all employees on changes in the company, including contracts won and lost and their value, quarterly town meetings to go over financial results, and a



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new intranet that offers copies of all corporate communications along with webcasts of analyst conferences and other meetings. Those efforts go a long way toward keeping all 57,000 employees apprised of the company's progress. Smith also asks a large number of field employees to help him meet vendors and select new software. And every Friday morning at 10, Myers holds a senior leadership team meeting with area senior vice presidents by phone. Myers has held these management meetings at all three companies he's worked at with Smith—same agenda: a weekly update on all turnaround initiatives.

"It's almost a religious thing. You just do it," Smith says. "It forces everyone to talk to each other."

Base IT Investments on ROI. Smith's profitability system at America West Airlines and the new financial systems at Waste Management were no-brainers for the turnaround team. But once you start giving systems-starved employees new applications, their appetite can become insatiable. So when it's time to move beyond the basic must-haves, Myers and Smith base their decisions on yield. All IT investments must show a 15 percent annual return.

At Waste Management, Smith has limited his IT budget to under 1.5 percent of the operating budget—\$113 million in 2000 and \$165 million in 2001—and he expects that investment to plateau right there. Among the IT initiatives that have made the cut is e-procurement.

Waste Management spends \$4 billion a year on everything from tape dispensers to trucks, and "everybody bought from whom ever they wanted to. If their uncle was running a tire store, they probably bought tires from him," Smith says. Now a new vice president of procurement is limiting Waste's vendors, reducing the number of truck body types from 60 to 14 and working with Vice President of E-Business Macy and Clarke to take purchasing online. By July 2001, Waste Management was buying all its office supplies online and had sent out an RFP for a

supply chain system that would enable the company to make all its purchases via the Internet. Myers and Smith expect \$75 million in savings by year-end and say that they'll eventually save \$400 million a year. Some other IT initiatives that have received the green light include fleet routing and maintenance software, a billing system, enterprise application architecture, a data warehouse and a new HR system.

tems should become evident in the second half of 2001, according to analysts. "But long-term productivity potential in terms of profit enhancement and cost-cutting, which is tied to these new systems, will take some time to see," says Tom Ford, senior analyst at Lehman Brothers in New York City.

"The management team is doing a great job of turning this company around," says Jaimi Goodfriend, an analyst at First Analy-

"Getting people to change their view of how to do something is often more difficult than implementing the mechanical change."

—MAURY MYERS

Among the plans that haven't gotten the go-ahead—installing global positioning systems in Waste's 33,000 trucks at \$1,000 to \$2,000 a pop. "Knowing where our trucks are, how fast they're going and whether they're in a McDonald's lot—there's some advantage there, but we haven't come to the conclusion that we should make that investment," Myers says. "We look at every single technology investment on an ROI basis."

ONE MAN'S TRASH

A year and a half into the Myers-Smith turnaround, board members, executives, employees, Wall Street analysts, previously peeved shareholders and the turnaround team itself are optimistic. Waste Management's stock, which was teetering around \$16 when Myers and Smith came aboard in late 1999, had jumped to \$30 by the end of June 2001. And the company, which lost a total of \$2.1 billion from 1997 to 1999, posted profits of \$124 million in the first quarter of 2001.

"Customer satisfaction is up, the stock price has doubled, and the company has created over \$6 billion in shareholder value in the last year," says Pastora San Juan Caferty, a professor at the University of Chicago and a Waste board member since 1994.

Bottom-line benefits of the new IT sys-

sis Securities in Chicago. "They're taking their time in doing so, but we'd prefer that time be taken for a company this size."

As for the future of the turnaround team, it appears that Waste Management will be the last stop on the magical turnaround tour.

"I'm an old guy. I'll be here as long as I'm needed," says Myers.

"I'm not young anymore," echoes Smith, who plans to retire in three years to dust off the plan he put on hold when Myers called about Waste: play a little golf, do some traveling. "What we've told people here is we're trying to build a foundation rather than build the ultimate system," Smith says. But that foundation has already made a difference.

"A year ago I went to this bankers meeting," says Smith, "and they were all anxious because they knew that the systems were broken and wanted to know what we were going to fix them. I told them what we were going to do. But it was like sitting on the edge of the bed telling them how great it's going to be. There's not much credibility there. This year I went to the same meeting and said here's what we've done, and we blew them away." **CIO**

Senior Writer Stephanie Overby writes frequently on IT leadership. She can be reached via e-mail at soverby@cio.com.

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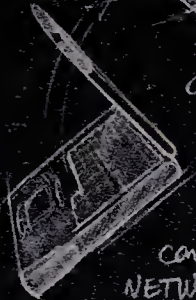
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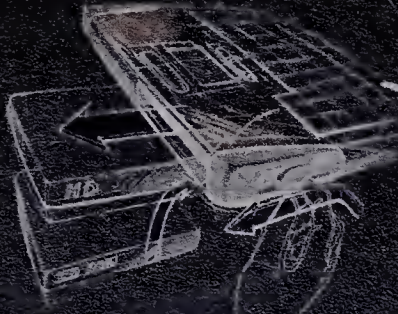
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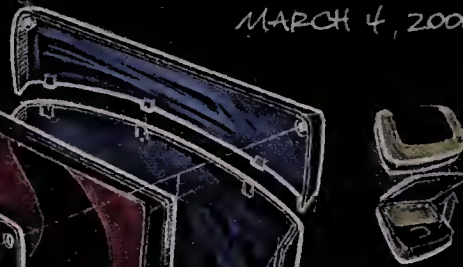
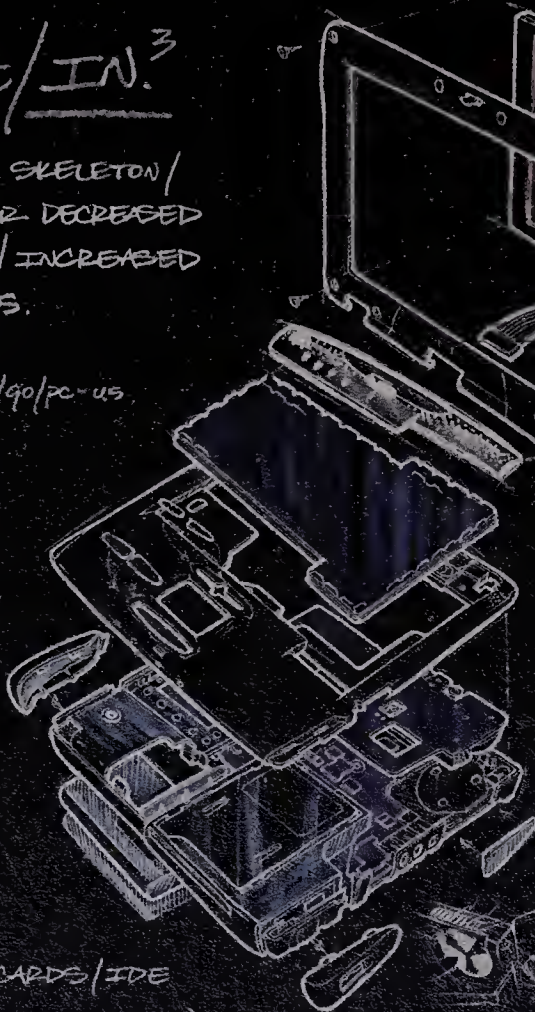


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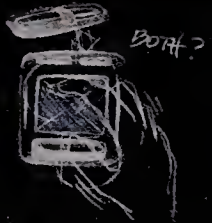
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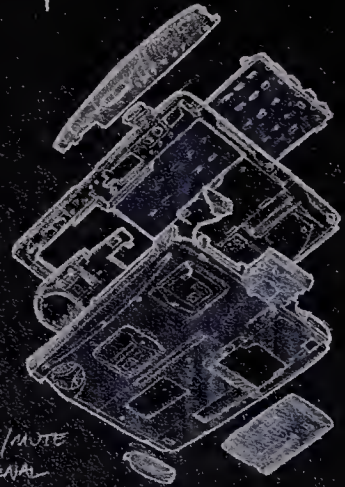
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YOUR Budget Playbook

The only cuts-in-spending game plan you'll need this season to contain costs and control the budget ball

BY CHRISTOPHER KOCH

It's the big budget Super Bowl. The clock is running out. The economy is down, and spending is tight. The CFO is blitzing you with budget cuts. He's counting on you to block him with a standard line about how IT is too strategic to be cut during hard times, and he's looking forward to crushing your argument with low revenue and profit forecasts. Instead, you blindside him with a simple plan that benefits you while telling him what he wants to hear. You say, "I'm going to spend money on making people more productive, not adding computers." The CFO is stunned, speechless, knocked off balance.

It's a difficult argument to counter. IT is the best—though imperfect—way to force improvements in the ways people do their jobs. "Computers don't make money. People do," says Paul Strassmann, consultant and IT budget researcher for Strassmann Consulting in New Canaan, Conn. Thinking about technology that way helps you sort out your IT budget priorities when you are approached by a strong opposing lineup of the powers that be. Software upgrades that don't improve the ways

things are done? Cut them from the playbook. New computers and networks that won't give employees new capabilities? Back to the bench. Got a demand for an across-the-board cut in IT staff? Time out on that one. Technology dollars spent on IT staff have a direct effect on raising sales and revenues (see "Halftime Show: The Case for IT Staffing," Page 76). Spend more on IT staff and your company will make more money.

Judging from a recent survey by CXO Media (CIO's publisher), "IT Spending and Lessons Learned" (see "Don't Drop the Ball," Page 84), CIOs are being asked to make serious cuts. But they're learning to deflect the damage. Asked to cut big implementation projects, they postpone them instead. Outsourcing—which has the potential to cripple the IT department while offering limited, if any, short-term savings—can be accommodated in slices.

Make no mistake, the CFO is after you. In the survey, four times more

Reader ROI

- Read about the big three of IT cost control: project postponement, outsource slicing and standardization
- Find out how your peers are spending money

CFOs (26 percent) said the IT budget should be cut during tough times than did CEOs and COOs (6 percent each). Since the majority of CIOs still report to the CFO (35 percent to 40 percent, according to Hudson, Ohio-based research company Hackett Benchmarking & Research), the CIO has to find a way to hang on to staff and keep strategic projects going during tough times. After all, these are the projects that prove IT's (and the CIO's) worth to the business. If companies reduce IT spending to the point where it's only able to just keep the wires untangled and the boxes running, IT will never get the chance to follow through on its promise of improving productivity and raising revenues.

FIRST DOWN: Postpone the Big Projects

The biggest IT projects—such as ERP, CRM, supply chain management and e-commerce—are the hardest and most expensive. No wonder many companies reconsidered their particular mountain-moving software projects this spring when the economy began to sour. But don't let tight times kill your big initiatives. Instead, offer to postpone them. It's the most popular way to cut costs, according to the CXO Media survey. More than 40 percent of survey respondents said they'd be postponing their new IT projects.

"I've only agreed to postpone the project for one quarter. In the meantime, I haven't stopped planning and preparing to do it."

—ROGER MOWEN, CIO, EASTMAN CHEMICAL

Roger Mowen, CIO of Eastman Chemical in Kingsport, Tenn., postponed his CRM project this spring when it appeared that demand for chemicals would be down for the year. That project is part of Mowen's master plan, but he is confident that he'll soon be able to get the project back on schedule.

Mowen, who reports directly to the CEO, is part of a four-person committee that runs Eastman day to day. With a CIO at the table, discussions at the committee's weekly meetings often turn to technology and its value and role in the company. Mowen's seat at the big table also ensures that Eastman will revisit his CRM plan frequently and sympathetically.

"I've only agreed to postpone the project for one quarter," he said in May. "In the meantime, I haven't stopped planning and preparing to do it." While the project hangs fire, Mowen is focused on revamping customer-facing work—such as sales support, for example—as well as internal processes.

Of course, not all CIOs have the same kind of power to affect their budget future as Mowen does. James Lapomardo, senior director of IT for videoconferencing company PictureTel, reports to a CFO and has had to recently postpone a critical CRM upgrade for at least a year.

Some of the best new product ideas have come from customers making passing comments on the phone or on warranty cards, says Lapomardo, but the Andover, Mass.-based company's ability to push customers harder for those comments is limited with its current software.

Halftime Show: The Case for IT Staffing

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Those that spend more on technology tend to have higher sales and revenues than those that don't. That's the finding of a groundbreaking study of the effect of technology spending on 1,300 U.S. corporations in 1998 by Sumit Sircar, professor and chairman of the Information Systems and Management Sciences Department in the College of Business Administration at the University of Texas at Arlington. But it's the people and processes that make the difference, not the boxes and wires, according to researchers. The strongest correlation between technology spending and increases in sales and revenue was found in the amount spent on the management of IS and training of IS people. Read his study in the *Journal of Management Information Systems* or check it out online at www.cio.com/printlinks.

Like Mowen, Lapomardo says he will focus on improving the company's current customer relationship work methods while waiting for the green light to resume working on the CRM upgrade. But he understands the danger of waiting too long. "All the momentum you've built up behind the project gets jeopardized when it gets postponed," he says. "It's a struggle to keep people focused on the planning aspects because they never feel like they're getting out of the gate on the project."

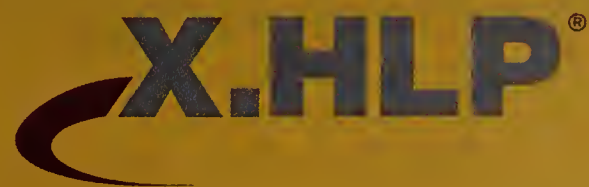
To get businesspeople's attention during a postponement, Lapomardo pulls them into small planning projects that are very narrowly defined. For example, Lapomardo has a few people working with him on very specific interfaces in the legacy CRM software to determine what type of information should be ported between sales and marketing.

"Businesspeople tend to put off really trying to understand everything the software

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will do until the project begins," Lapomardo says. "You have to use a postponement as an opportunity to get them involved in small pieces of the project so they will understand it better when you get going for real."

GAME PLAN: Determine if the project is really worth fighting for. If information is not a critical part of the product or service you sell, then you can probably afford to hold off on that CRM or other big project. Clinging to it simply because the media or analysts say it's the latest, greatest thing would be foolish. "If you're a gravel and cement company, there's only so much that IT can do for you," says Kurt Potter, research director for Stamford, Conn.-based research company Gartner. "But I can guarantee you that you won't see Charles Schwab cut its IS budget by 35 percent in this downturn or any downturn. Information is part of its products."

And don't forget to keep

the businesspeople involved even when a project is on hold.

SECOND DOWN: Outsource by the Slice

When times get tough, companies reflexively look to IT outsourcing to save money. But mistakes happen, and there is less room for error in tough times than in good, warns Strassmann. "Anytime you yank out all your trees and haul them over to a new orchard, some of them are going to die," he says. "The time to outsource is when you have lots of money to cover up the glitches."

Given the complexities of turning over all of IT to someone else, outsourcers now let you do it by the slice. Many companies have had good luck outsourcing their websites because the work of maintaining a site is predictable and doesn't vary much

by company or industry. Similarly, infrastructure outsourcing—data centers, Web servers and networks—is growing because the work of providing pipes and networks and servers is universal and repeatable, and outsourcers can achieve economies of scale that individual companies cannot.

It's getting much easier to outsource the machines rather than the people. A small industry is rising around the idea of letting

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someone else worry about the boxes and wires while you focus on maintaining the software. There's little reason to build a new data center yourself anymore when a co-location company can rent you space in a monster data center that serves many different customers at once. A new data center costs \$400 per square foot today for individual companies, says Tom Mangan, managing partner for enterprise technology solutions for Andersen, a Chicago-based consultancy. But leasing from the infrastructure providers costs \$40 to \$100 per square foot—or as low as \$11 per square foot from some of the dotcom data centers that went out of business in the recent technology bust.

Chris Corrado, CTO of New York City-based financial services company Merrill Lynch, is working on a multiyear plan to move the company's data for its institutional customers to a storage outsourcer, StorageNetworks. "This is not something you do overnight," he says. "You're changing business processes for managing this stuff, and you're introducing new technologies to store it." Corrado thinks he'll save 47 percent in storage costs when he finishes shifting things over in 2003 because the outsourcer's work methods are better than his. "Let's say you need to acquire 100 gigs of storage," he says. "The old-fashioned method is you find vendors, buy hardware, integrate it into your environment and manage it. With a managed service, you just say,

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get typical for most big outsourcing companies, the outsourcer needs to do the work for 35 percent less than your internal people can. So don't expect any improvements in service

But that equation just doesn't close," he says.

If you need another argument against wholesale outsourcing, point out that the costs of picking an outsourcer and negotiating a contract—about \$150,000 to \$200,000 for a midsize company (under \$100 million in revenues), according to Giga Information Group—will most likely suck up any short-term savings.

But tread carefully if you outsource by the slice. Each time a new type of outsourcing comes along—such as storage networks or colocation data centers—the going can be rocky as outsourcers learn about the new technology and figure out ways to gain economies of scale across many customers at once. Customers start looking more like guinea pigs than clients. Bill Hutchison, global director for the technology industry in business consulting for Andersen, has seen four different technology waves in outsourcing, from sharing space on mainframe

"The centralization push has to be initialized by senior management, otherwise businesspeople think I'm taking away their laptops."

—SEAN MAGEE, CIO, LANIER WORLDWIDE

GAME PLAN: Your IT department has an economic advantage over any outsourcing company: It doesn't need to make a 25 percent profit margin on the work it does. In order to lower your IT costs by 10 percent and still hit that 25 percent profit margin tar-

for your 10 percent savings, warns Douglas Plotkin, director for Meta Group Consulting, a division of Stamford, Conn.-based research company Meta Group. "Most outsourcing customers expect both lower costs and improved service levels from their outsourcer.

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computers in the '60s to ASP providers today. "Each time you cross a technology barrier, the costs of outsourcing go up to the point where you'd be better off doing it yourself," he says. Once the technology settles down and the outsourcers gain experience with it, the savings increase. Hutchison believes we've only just crossed one of those barriers with ASPs.

THIRD DOWN: Standardize and Centralize

Good centralization and standardization efforts save money when they can create similar work methods for as many people as possible without limiting anyone's ability to do a job well. For Mike Webb, senior vice president of IT at Singapore-based Flextronics, standardizing the work of installing and maintaining ERP is a matter of survival, and his ability to keep costs in check by doing this is a winner in tight times as well as flush.

Flextronics is a contract manufacturer that, like its competitors SCI and Solectron, makes the technology equipment that goes out under well-known brands such as Cisco

and Dell. Flextronics' margins for this work are so low—about 4 percent to 5 percent, according to Webb—that the company depends on fast growth and manufacturing efficiencies to stay profitable. In August 2000, for example, Webb's IT team brought 13 factories online—some new, some acquired from outsourcing customers—with deep, complex ERP systems. The only way to do all this work in a month, Webb says, is to standardize on the same technology (Baan ERP in this case) and forbid any customizations to the systems.

To make sure the edict doesn't hamstring the factories, Webb has a committee that meets regularly to review the work processes in the standard software to see if they can be improved and to add new ones to fill gaps that crop up. The standard processes, like finance and payroll, don't change much at all. But for more complex manufacturing work, Webb's group offers three or four options to give the plants some degree of flexibility and to fit the different types of manufacturing—cell phones, routers or PCs, for example—the company does for its clients.

Though the savings will not be readily apparent in the short term, the long-term savings will be massive, as Webb likes to say. The price of customizing ERP is very high. Over the five-to-seven-year average lifetime of a big enterprise software package, support and maintenance make up 80 percent to 85 percent of the total cost, dwarfing the amount spent on installing the stuff (about 15 percent to 20 percent), according to Andersen's Mangan. Each customization you make in ERP requires extra support and maintenance because the software vendor won't

support changes.

Your IT employees will have to do it—trapping valuable re-

sources in an endless cycle of customization each time you upgrade the software.

GAME PLAN: Though standardization seems like a tactical, IT-only exercise, it will not succeed without the support of top-level business managers. "Senior management always wants to know how much we're spending on IT," says Sean Magee, CIO of Lanier Worldwide, an office products company based in Atlanta. "That means centralizing spending on things like PCs and databases and networks. It's the only way I can know how much we're truly spending as a company. But the centralization push has to be initialized by senior management, otherwise businesspeople think I'm taking away their laptops just because it's my sandbox and my toys."

According to Gartner, in the course of figuring out all the IT you have secretly stashed around the company, you may discover that your infrastructure needs are woefully inadequate, requiring more investment 40 percent of the time. But with a good centralization program, IT infrastructure costs go down by 10 percent to 20 percent over time.

Controlling IT costs with an eye on improving work takes longer and might not result in as many short-term savings as simply driving through the IT budget defense. But the long-term benefits will far outweigh the disadvantages. Big enterprise software projects will go more smoothly, take less time and cost less. Outsourcing contract costs will not balloon over time as the outsourcer attempts to extract its margins out of a low-ball initial agreement. IT won't have to waste time acting as guard dog over untenable standardization programs. The measure that ultimately matters most, productivity, will rise over time because the actions IT takes will serve the goal of reducing the time it takes people to do their work. ■

Executive Editor Christopher Koch can be reached at ckoch@cio.com.

Read the "Don't Drop the Ball" survey on Page 84.

Hail Mary Passes

*Need quick cuts to the budget?
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- **Lease rather than buy hardware.** Actual savings are minimal, but leasing keeps technology infrastructure out of the capital budget, which is always vulnerable during hard times.
- **Renegotiate contracts with vendors.** Telecom, especially. Increased bundling of services means you can get a deep discount from one vendor rather than having two or three.
- **Kill wireless.** The technology is still changing too quickly. Wireless Internet access is worthless, and most people don't need a mobile phone.
- **Reduce support times.** Do your people really need 24/7 support? Don't they sleep?
- **Reduce contract help.** Some consultants and part-timers may not be needed.

—C.K.

today's
business
thought:

what's the
difference between
our
worldwide
IP network
and other
companies'?

for one thing,
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exists.



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DON'T Drop the Ball

Our "IT Spending and Lessons Learned" survey of IT executives reveals some surprises about who's spending what—and how CFOs are targeting your budget

BY LORRAINE COSGROVE WARE AND BEN WORTHEN

IF YOU WANT TO SAVE your IT budget, get closer to the business and the customer. That's the key finding of the recent CXO Media (CIO's publisher) survey, "IT Spending and Lessons Learned." The good news is that IT is more closely aligned with business initiatives in today's tougher economic times than ever before. Executives in our survey indicated that 10 years ago, when the United States last faced a sluggish economy, companies had a greater tendency to reduce the IT budget as a cost savings measure. Today, IT is viewed as a strategic advantage; close to one-quarter (23.5 percent) of the 297 CIO and executive-level respondents said that IT spending should increase during a slowing economy.

"I think that realizing the importance of IT justifies the investment. That means looking at it not as a cost center but as a potential profit center. If you deliver critical information, then the cost is justified. If you don't make the investments and let infrastructure

be a limitation, then making IT cuts is like cutting a marketing budget."

—Mark Hoffman, CIO, The J.C. Robinson Seed Co., producer and seller of hybrid seed corn, Waterloo, Neb.

1 MORE BUDGET INCREASES THAN CUTS

Close to half of our respondents said they increased their IT budget in 2001 from the previous year, while 20.9 percent said their budget decreased. The remaining 29.3 percent indicated that their IT budget remained the same. On average, IT budgets increased 12.1 percent. (Bear in mind: For the 2000 budget, CIOs were citing 17 percent increases.) Key factors cited for increased budgets include growth, customer demands, new or upgraded applications, upgrading infrastructure and competitive pressures.

"We're in health care. Just because the tech stocks aren't doing well doesn't mean people aren't getting sick. But we've been

squeezed a little because the federal government reduces payments as do insurance companies. We were pressured to reduce our budget a little but not as dramatically as our peers. We didn't have the big jumps in previous years either."

—Rick Crabtree, CIO, St. Joseph Healthcare, health-care services provider, Nashua, N.H.

2 DEMONSTRATING VALUE, CONTROLLING COSTS

Executives in our survey indicated that CIOs are under great pressure to prove the value of IT projects and justify spending and as a result are shifting their priorities to projects that have a measurable ROI. When asked how specifically they are reducing IT expenses, they most frequently cited postponing IT projects (40.1 percent), negotiating tougher vendor and contract agreements (38.4 percent), consolidating technology vendors and products (35.7 percent), instituting hiring freezes (26.2 percent), and reducing

head counts and IT staff (25.2 percent).

"Right now it appears that the budget will go up next year. It will be flat for operational run rate stuff, but we are looking at a 15 percent increase for projects, things that as we go through the year we will either do or not do—projects like collaborative commerce, e-business and some supply chain. However, we can and will postpone them if we need to."

—Bill Rogers, VP of IT and e-business, Johnson Controls, automotive systems and facility controls, Milwaukee

3 DIFFERING SPENDING PHILOSOPHIES

The majority (61.7 percent) of those surveyed felt that companies should maintain IT spending during a slowing economy, while 24.5 percent said IT spending should increase. Only 13.8 percent said IT spending should decrease in slower economic times. The chief operating officers' views on IT are very similar to the CIOs' views, both groups stressing the efficiencies created by IT. The CEOs value IT more from a strategic perspective, citing competitive advantage as a reason to increase IT spending in a slowing economy. The CIOs are most passionate, of course, stressing the need to think long term about IT spending. The CFO is the dark cloud, listing the need to conserve capital and reduce costs to "keep the doors open."

"The CFO and CEO in our case are impressed by our ability to get things done at a lower cost level. Given that we can do that, they are more amenable to the strategic initiatives. Every year we are asked if we can give [back] a half-million bucks, and we are always able. We have built up credibility with management that we aren't just spending money haphazardly."

—William Crowell, CIO, Meredith Corp., media and marketing, Des Moines, Iowa

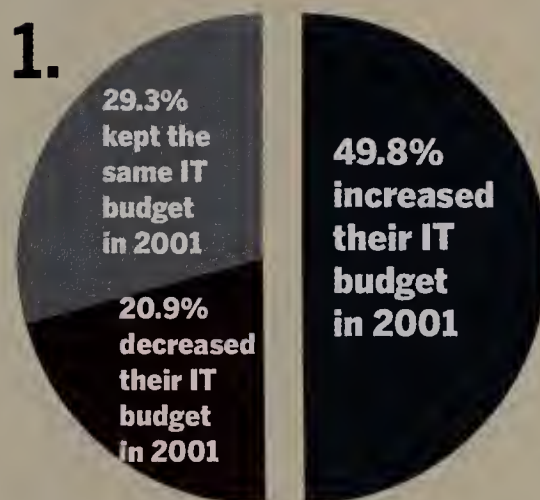
4 BLOCK THAT CFO

CFOs were more inclined to reduce IT spending while CIOs, COOs and CEOs were

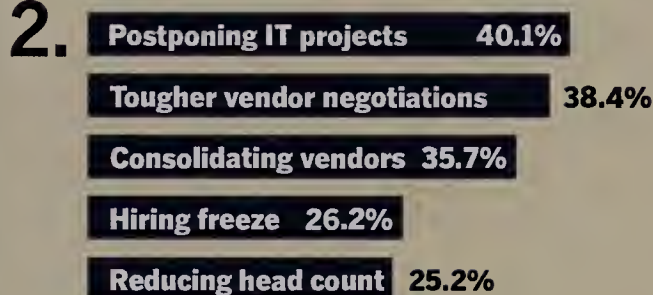
IT Spending and Lessons Learned

Highlights from the survey of 297 CIOs and executives

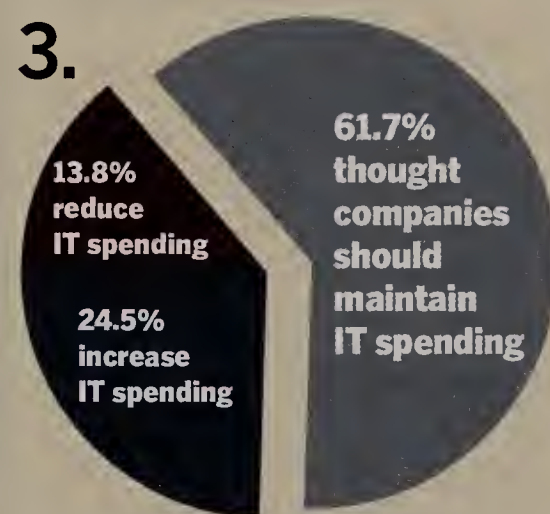
Was your 2001 IT budget increased, decreased or did it remain the same as your 2000 IT budget?



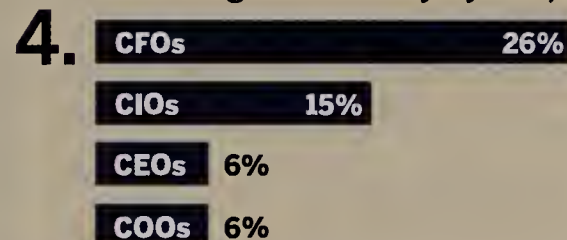
2. How are you reducing IT expenses?



3. In your opinion, during a slowing economy, should companies reduce or increase IT spending?



4. In your opinion, during a slowing economy, should companies reduce IT spending? (percentage answering affirmatively by title)



more likely to increase or maintain IT spending in the face of a slowing economy. A greater number of CFOs (26 percent) said IT spending should decrease in tougher economic conditions compared with the views of CIOs (15 percent), CEOs (6 percent) and COOs (6 percent).

"IT should increase if you are spending it in the right areas. Instead of buying the newest laptop, you should put it into a soft-

ware package that will drive efficiency in other parts of the business."

—Marc Grove, CIO, AmericasDoctor, pharmaceutical services, Gurnee, Ill.

SURVEY METHODOLOGY

CXO Media's online survey was administered from May 21 through June 7, 2001. CIOs, VPs and directors of IT were selected from CIO's circulation file and invited by e-mail to take the survey. In addition, names of CEOs, CFOs and COOs were chosen from *Darwin* magazine's (CIO's sister publication) circulation file and invited to participate. The results shown here are based on 297 responses to our survey. **CIO**

CIO.com

To read the full "I.T. SPENDING AND LESSONS LEARNED" survey, go to www.cio.com/printlinks.

Case Files: Northrop Grumman

CUSTOMER FOCUS

► KNOWLEDGE MANAGEMENT ◀

PROJECT MANAGEMENT

VALUE PROPOSITION

COMPANY INFO

ORGANIZATION

Air Combat Systems, a business area within Northrop Grumman Corp.'s Integrated Systems Sector

HEADQUARTERS

El Segundo, Calif.

EMPLOYEES

4,600

2000 REVENUES

\$3.15 billion for the Integrated Systems Sector (Northrop Grumman does not report revenues for individual business areas)

LOCATIONS

Eight

URL

www.northropgrumman.com

KM PROBLEM

How to retain the knowledge and experience in employees' heads in the midst of downsizing and reorganization

THE PLAYERS

SCOTT SHAFFAR

Project Manager

JEFF WESSELS

KM Project Leader

CASE ANALYST

TOM DAVENPORT

Director of the Accenture Institute for Strategic Change

Thanks for the Memories

As Northrop Grumman cut its workforce, the knowledge needed to keep its aircraft flying was in danger of being lost. So the company polled its employees to figure out who knew what and whether they were willing to share. BY MEGAN SANTOSUS

IN THE LATE 1990s, the defense industry, no longer fighting the Cold War, was consolidating and downsizing. At Northrop Grumman Air Combat Systems (ACS), that presented more than just a short-term headache. As lead contractor for the B-2 Stealth bomber, an aircraft that was nearing the end of its production life, ACS was in danger of losing the expertise it needed to support and maintain a complex machine that would be flying—carrying precious lives and cargo—for years to come. So ACS instituted knowledge management procedures designed to capture the so-called tacit knowledge, or know-how and experience with the B-2, locked in its employees' heads.

By 1999, with more cuts on the way—and with more knowledge in danger of being ushered out the door—Project Manager Scott Shaffar wanted to institute KM initiatives throughout the El Segundo, Calif.-based Northrop Grumman business unit. But before design-

ing a program, Shaffar wanted to find out what barriers, if any, prevented employees from sharing knowledge with their peers. He figured that if he could apply hard numbers to ACS's cultural attitudes about knowledge, he'd have a road map for designing a unitwide KM program and getting the funding for the technologies needed to facilitate it. So Shaffar decided to conduct a knowledge audit, surveying employees about their knowledge-sharing habits. That, he believed, would be a quick way to not only assess ACS's readiness for a formal knowledge management effort but would also highlight those areas where sharing was not happening.

Shaffar hired Boston-based Delphi Group to conduct the audit and derive a baseline pulse of the unit's knowledge-sharing culture.

"The audit helped us turn gut feelings into numbers," Shaffar says, adding that he suspected employees would find the self-contained nature of the unit's programs a hindrance when



Northrop Grumman Project Manager Scott Shaffar (left) and KM Project Leader Jeff Wessels (with a model of the F/A-18 Super Hornet fighter jet) discovered that their people would share information if they had an easy way to do so.

The B-2 KM effort was deemed successful, and when ACS announced in 1999 a reorganization that would cut the workforce from 8,000 to 6,000, ACS established a four-person KM team charged with developing a unitwide strategy. That's where the audit came in.

"Sure, we could've introduced a database technology and hoped that employees used it," says Shaffar, "but we wanted to avoid that black hole approach." In other words, Shaffar wanted to be sure that the expertise collected in centralized systems would not only be useful, but that it would be used.

The Delphi Group's key weapon in administering the audit was KM2, which begins with a customizable, 97-question survey

it came to sharing knowledge. Now he's using this information to implement a bigger KM project and get the funding he needs to build the systems to support it.

How Do They Know What They Know?

Knowledge management first gained a foothold in ACS's B-2 bomber program in the late '90s. As the B-2 program was winding down, and engineers with 20 or so years of experience were leaving, ACS established a 10-person KM team to identify subject matter experts and capture the content of their brain cells.

After creating about 100 knowledge cells (including armaments, software engineering, manufacturing and so on) and identifying 200 subject matter experts within those cells, the KM council turned its attention to knowledge capture. The team created websites for each of the knowledge cells and logged information about the knowledge experts into an expert locator system called Xref, short for cross-reference. Using Xref, employees can search for information in any number of ways, including by employee name, program affiliation or skill. If, for example, the B-2's landing gear is locking up, one can find the landing gear expert through Xref.

survey designed to unearth employee attitudes about knowledge and knowledge sharing, and in the process identify areas for improvement. The survey asked questions such as, "From your perspective, to what extent is the knowledge that you and your team generate reused by other teams?"

The survey was e-mailed to 4,760 ACS employees at six locations across the country. Another 200 employees on the shop floor received paper-based surveys. Participation was voluntary; employees got a free lunch for taking 30 minutes of their own time to complete the survey, and Shaffar was pleased with the response: 3,380 employees

completed the survey for a rate slightly better than 70 percent.

Employees completed the surveys in January and February 2000. In March, Delphi consultants analyzed preliminary results and targeted 125 employees for face-to-face follow-up interviews.

What They Think About What They Know

"We expected that there would be challenges [when] sharing knowledge across programs, especially those with different customers and in different locations," Shaffar says. The survey results backed this up. But what Shaffar did not expect was the degree to which employees recognized the value of their fellow employees' know-how and their willingness to share information. Asked to rank the importance of knowledge in the discovery, development and marketing of products they worked on, 75 percent said knowledge was either very or somewhat important. In a nod to the importance of tacit knowledge, 51 percent said the brains of ACS employees were the primary source for best practices and lessons learned. (By comparison, 16 percent said electronic documents; 13 percent said e-mail; another 13 percent said electronic knowledge bases; and only 7 percent said paper documents.) A majority (56 percent) also characterized their colleagues as knowledge sharers rather than hoarders.

Those results, Shaffar says, reinforced his belief that ACS had, at heart, a culture that would be receptive to a formal knowledge management push. But other findings indicated that there was still a lot of work to be done. Among the more eye-opening stats: Almost half of the employees spent at least eight frustrating hours each week looking for information they needed to do their jobs, costing ACS an estimated \$150 million annually. Employees said only 6 percent of knowledge generated by teams was widely reused by other teams throughout ACS. And 31 percent of respondents believed that ideas generated by junior staffers were not valued and were likely to

get smothered by the ACS bureaucracy.

Armed with the survey's hard numbers, the KM team devised a three-pronged strategy focusing on people, processes and technology.

EXPERT ANALYSIS

SNEAKY KM TRICKS

BY TOM DAVENPORT

I TRULY HOPE YOU LIKED THIS CASE FILE, because I expect we'll all be hearing much more about similar situations. Preventing or replacing "lost knowledge" from departing employees is going to be a big deal. In Northrop Grumman's case, the motivation came from an impending head count reduction. While I suspect there will be some of that in the future, the more common situation will involve massive retirements, as baby boomers move on to the next stage of life, creating a giant sucking sound as their knowledge and experience leave the workforce.

Northrop Grumman, then, is a harbinger of our future and is clearly smarter than most employers who are canning lots of people. However, the case invites one major question about massive layoffs as a motivation for knowledge management initiatives: Why should someone participate?

If I suspected a layoff, and a headquarters type came around talking to me about knowledge management, it would probably take more than a free lunch to get me to spill what I know. I might either hold back my knowledge, on the assumption that the bosses would be less likely to ditch me if my knowledge remained in my head, or I'd wildly exaggerate my expertise levels in the hopes that they'd want to hold on to the experts they've got. Maybe the Northrop Grumman people were very circumspect about the reasons for this knowledge management investigation, though that sort of thing tends to slip out.

As to the specific methods used by the company to address potential lost knowledge, it's all reasonable stuff. The term *knowledge audit* tends to imply a high level of rigor, but it's really shorthand for "a survey of knowledge attitudes, beliefs and capabilities." It's a good starting point for any major KM initiative, as it provides a sense of the key problems and issues.

The technology in the case sounds like a well-rounded portfolio. However, only two of the applications seem to address the key issue at the company: extracting and sharing tacit knowledge. Expert locator and collaboration technologies can aid in the circulation of tacit knowledge. But all the other typical KM applications in the case are generally useful only for explicit (not pornographic, but rather easily put in codified form) varieties of knowledge.

My hope is that Northrop Grumman and other companies will not become too successful at extracting knowledge from people before they leave the organization. After all, it's already too easy to fire people.

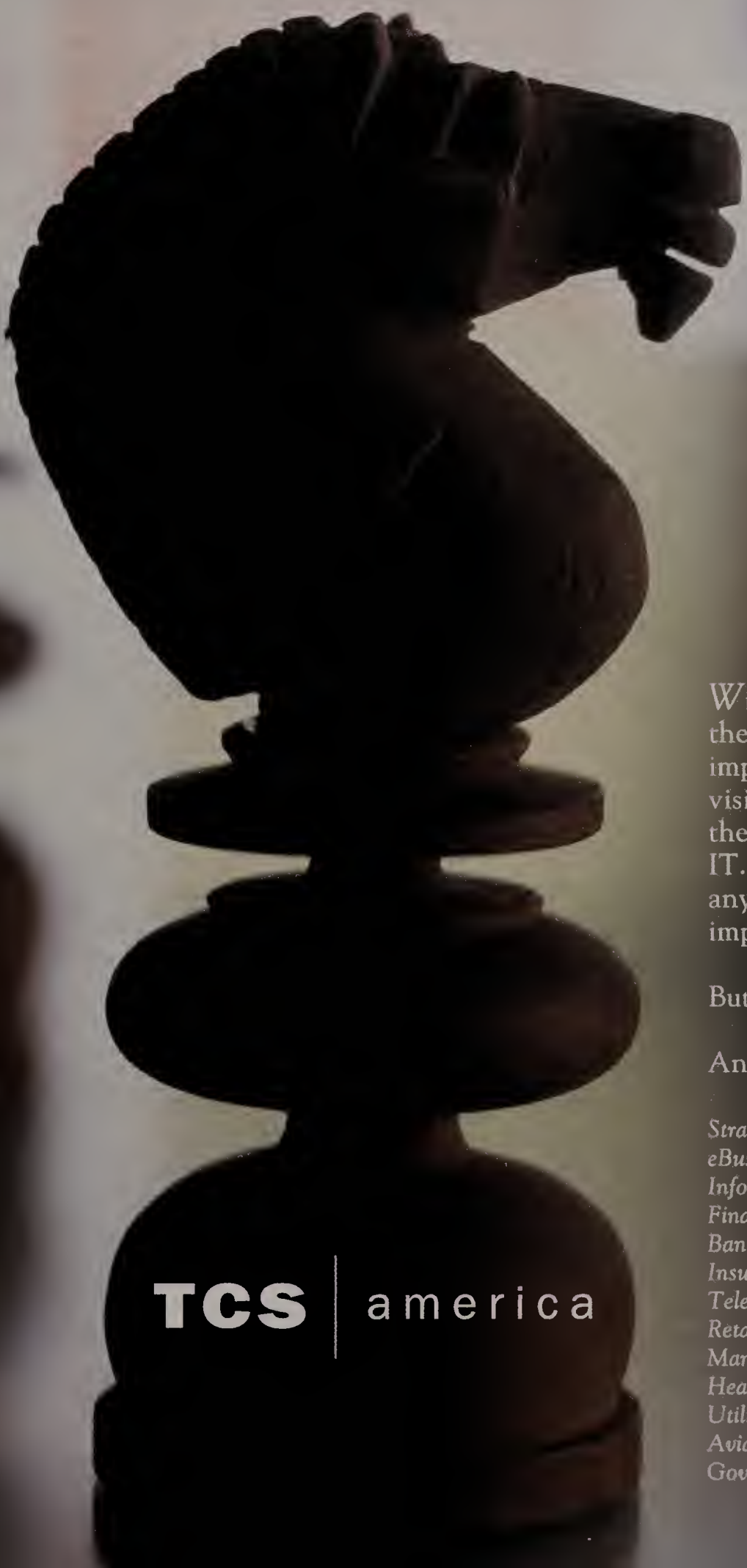


Tom Davenport is director of the Accenture Institute for Strategic Change and a distinguished scholar in residence at Babson College. He can be reached at davenport@cio.com.

How to Make Sure They Don't Forget What They Know

On the human side, the KM team set out to identify and then retain experts throughout ACS, establish communities of employees

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who had similar responsibilities (known in KM circles as communities of practice) and facilitate sharing among employees.

One such community of practice consists of ACS project managers in different programs. While many such communities exist informally, Shaffar says it's important to identify the ones that are strategically important, raise their visibility, and provide funding for technologies and systems to support them if necessary. "Establishing a community of practice should enable knowledge sharing across boundaries," Shaffar says, and end the isolation of people working in individual product lines.

As for processes, the KM team focused on finding out how people captured, organized and reused existing knowledge. For the most part, employees maintained knowledge in their own files. There was no central repository where lessons learned could be easily shared or accessed by employees who weren't personally involved in a project. In



With the B-2 Stealth bomber program winding down, and the engineers who built it leaving, Northrop Grumman needed to capture the knowledge necessary to keep it flying.

mation into a PowerPoint template that can include pictures, drawings and notes on the appropriate action needed to rectify the issue.

How has the KM team integrated the tracking system into the workflow? Each week, engineers meet to discuss unresolved issues. To give a briefing on an outstanding issue, an engineer must first input data into the system; once engineers resolve an issue, it automatically becomes a lesson learned.

When it comes to technology, the audit

filing systems, disparate locations and an inability to locate internal expertise, which the audit highlighted. Currently, ACS has implemented the Xref system throughout the engineering unit as well as in systems for managing documents, collaborating and capturing knowledge. Other initiatives, including portals that push personalized information, are in pilot phase.

Although Shaffar's team is still building a business case for KM—attempting to show the ROI of making information more easily accessible to employees—ACS will continue to invest in KM initiatives. (ACS won't reveal specifics, but it does say that overall investments in KM will increase in the future.) The KM team plans to conduct follow-up audits every 18 months or so to keep tabs on initiatives and culture. And while there's an interest in devising an ROI methodology, Shaffar says that executives are satisfied with soft benefits such as better decision making and improved collaboration.

Now that employment levels have settled at 4,600, ACS's hopes for KM have shifted. Rather than serve as a mode of retaining knowledge, ACS views KM as a way to increase innovation and speed customer responsiveness. "We're positioning ourselves for the growth we see ahead," says Wessels. If innovation and speed translate to cost savings for the customer, then that's the ultimate sign that KM pays off. **CIO**

The audit discovered that 31 percent of the workers believed that ideas generated by junior staffers were not valued and were likely to get smothered by the ACS bureaucracy.

response to that finding, the team implemented technologies designed to collect and disseminate lessons learned. The F/A-18 fighter jet program, for example, now has a Web-based system that capitalizes on years of technical expertise by tracking structural problems with the aircraft. When an issue surfaces—a cracked part, for example—the first thing an engineer does is search the tracking system's 900 previously encountered experiences. To add an issue into the system, an engineer inputs the relevant infor-

helped the KM team recognize the need to integrate the various KM systems at ACS. "It was clear from the audit and follow-up analysis that ACS had a lot of sources of information, but no central repository," says KM Project Leader Jeff Wessels.

The technology pieces of the strategy—tools such as the homegrown Xref system, collaboration applications and document management systems—essentially serve as the glue lashing the KM initiative together. The audit revealed that people would share information if they had an easy way to do so. The technology initiatives that focus on five areas—portals, expert locator, knowledge capture, media management and collaboration—are a result of the barriers to sharing information, such as paper-based

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What You Need to Know About Public & Private exchanges

The choice isn't just whether to participate in an exchange, but whether to go public, private or a combination of both

BY ELANA VARON

IF YOU'VE EVER BOUGHT ANYTHING FROM HEWLETT-PACKARD, YOU PROBABLY

haven't given the company's logo much thought. But making sure that thin plastic strip gets stamped on every product is always on Corey Billington's mind.

Last November, the company started buying its logos through a private marketplace that Billington, HP's vice president of supply chain services, helped establish between four plastics manufacturers and the 49 contractors that make HP's products. While the logo is hardly the most critical component, if that supply chain were to break down, Billington figures Chairman and CEO Carly Fiorina would be calling. "It would be an unpleasant conversation," he says. "[She'd say], 'You know, we don't ship products without our logos on them.'"

Billington and his staff spent more than two years building the private network—called GetSupply—and training its manufacturing partners and internal procurement professionals to use it. He estimates the network has trimmed 30 percent from the cost of the logos—a \$7.5 million savings off an annual \$25 million expense. Now HP is adding its memory suppliers to the exchange. Sharing demand and production data with a finite set of suppliers makes economic sense, says Billington. The private exchange lets HP referee the marketplace, ensuring a steady supply of parts and more efficiently distributing the workload among its suppliers.

Executives in other industries are now deciding whether they should build their own B2B marketplaces or participate in public trading hubs as investors or simply users (see "Terms of Exchange," Page 94). As dozens of public exchanges fold and

Reader ROI

- ▶ Learn the pros and cons of public versus private exchanges
- ▶ Find out what types of IT investments are required to participate in an exchange
- ▶ Discover strategies for coping with the fast-changing world of B2B exchanges

A man in a dark suit, white shirt, and patterned tie stands in a warehouse or industrial setting. He is looking slightly to his right. The background shows large white storage containers and industrial equipment.

**Corey Billington,
Hewlett-Packard's
vice president of
supply chain services,
relies primarily on
private exchanges
to ensure a steady
flow of the parts his
company needs.**

dozens more struggle with profitability, conventional wisdom says smart companies should cement connections with current suppliers and customers, but that wisdom is only partly true. The solution should depend on your business needs.

Looking at a few companies in a single industry such as electronics manufacturing shows CIOs taking diverse approaches to exchanges. When trading proprietary information such as product design or forecasting data with established customers and suppliers, those companies opt for private marketplaces. When buying and selling commodities or finding new trading partners, they turn to a public exchange. And many companies also do business in both environments.

Public exchanges, including established ones like the steel industry's e-Steel, hope to boost revenues by hosting private supply networks for their members. At a recent conference, Mohan Sawhney, McCormick

Tribune professor of e-commerce and technology at Northwestern University's Kellogg Graduate School of Management in Evanston, Ill., predicted such hybrid exchanges would become the "markets of the future."

Whether or not to take advantage of those emerging services is "one of the strategic decisions a CIO needs to make," says HP's Billington. "Let's think about the most private of private exchanges, a one-on-one. When I talk to the Converge people, they say, whatever we pay [for that capability], they'll do it for 20 percent less. We'll have to think carefully about that." HP was one of 15 companies that helped found Converge, a public exchange for technology and electronics manufacturers. As HP was building its private GetSupply exchange, the company divested itself of another trading network it had built to buy and sell parts at auction. The network, called Trading Hubs, became the online auction system used by Converge. HP

now pays Converge to procure scarce parts and liquidate excess inventory.

The interlocking decisions of buyers and suppliers will determine which trading environments take hold during the next few years. "The conditions are not unlike what they've always been for a company to [decide] whether it's to their advantage to deploy a technology," says Joan Harbin, research director of AMR Research's B2B marketplaces practice in Boston. "One consideration is what are your competitors doing? Another is what does it cost?"

PRIVATE PROPERTIES

Lisa Colnett, CIO of Toronto-based electronics manufacturing services provider Celestica, linked her exchange strategy to that of her customers. Six of Celestica's biggest customers, including HP, have private exchanges through which they trade information with Celestica on product designs, sales forecasts and production capacity. Two others, Cisco and Sun, have famously eschewed public exchanges. "We set up an infrastructure to have secure links with our customers even before [exchanges] came along," Colnett says.

Two years ago, Celestica set up a portal for its 10,000 suppliers, 1,000 of which now use it to pull production planning information from the company's supply chain systems. When Celestica gets demand forecast data from Sun, for example, suppliers can view it through the portal and let Celestica know how quickly they can get the right materials into the manufacturing pipeline. "We've been able to significantly improve our time to build, and we utilize assets and people better," says Colnett.

To build the supplier portal, Celestica dedicated servers, deployed certification software to manage access and used middleware to move information between internal systems. For some partners, Celestica deployed design collaboration software. The hardest part of building links with trading partners, Colnett says, is synchronizing each company's data and business processes.

Terms of Exchange

Public and private exchanges have subtle differences, but they both serve important functions

STILL NOT SURE what exchanges are all about? You're not alone. "The definition is debated in the market by participants and owners and analysts and vendors," says Joan Harbin, research director with Boston-based AMR Research. She offers a simple way to think about exchanges—websites that let you trade information with your customers and suppliers.

Private exchanges are owned and operated by a single company. The owner uses the exchange to trade data exclusively with established suppliers and customers.

Those exchanges let buyers centralize and manage purchasing from preferred suppliers. Companies also use them to trade proprietary data, such as product designs and demand forecasts, to improve planning and reduce inventory costs. The investment required to participate in a private exchange depends on the extent to which trading partners need to integrate their systems to share data. The exchange owner generally chooses the technology for the exchange and sets policies for its operation.

Public exchanges are owned by industry consortia or independent investors and have their own board of directors. Though each exchange sets its own rules, they are generally open, for a fee, to any company that wants to use them. One selling point for public exchanges is that they provide services and a common technology platform. The services offered by many public exchanges include auctions, spot buying and ordering from participants' catalogs. They may also offer payment services and industrywide demand forecasts for products or supplies.

—E.V.

It wouldn't be hard to integrate Celestica's systems with public exchanges, says Colnett, but she has little interest in doing so because their capabilities duplicate what she has built in-house. Besides, owning the infrastructure through which Celestica communicates with its partners gives her company a competitive edge. Colnett doesn't attribute specific financial results to Celestica's private exchange participation, but she does think it helps the bottom line. "Because supply chain [management] is such a critical part of what we do," she says, "there's a major expectation that we are leaders in using e-business tools to do that."

Chris Whitmore, an analyst with Deutsche Banc Alex.Brown in San Francisco, thinks private exchanges are attractive because they're efficient. "When there's direct communication between suppliers and customers, information flows more naturally," he says. Public exchanges can add a needless middleman.

However, Colnett isn't ruling out using a public exchange in the future. "If we felt there was a design tool that was better available through an exchange and our customer agreed, absolutely we would invest in an exchange," Colnett says. Meanwhile, she has outsourced some of Celestica's online trade. Celestica implements Ariba's auctioning software when the company needs to buy commodity parts such as memory capacitors. Last fall, Celestica became an investor in PartMiner, a public exchange specializing in electronics components procurement. Celestica uses PartMiner to dispose of surplus parts and made the investment to influence the services it provides. Colnett decided auctioning capability isn't strategic, so she doesn't need to maintain it in-house.



Celestica CIO Lisa Colnett has linked her exchange strategy to that of her customers and primarily makes use of private exchanges.

READY TO GO PUBLIC?

Public exchanges haven't become a primary procurement venue because they're not as reliable as contracts with preferred suppliers, says Whitmore. However, HP's Billington

believes there's untapped value in public exchange auctions. He says using those hubs can change how companies manage supplies by helping buyers account for the risk of surplus and shortage.

Billington imagines public exchanges that let buyers and suppliers trade not physical goods but positions on future supplies, such as safety stock—inventory kept on hand in case supplies run short. "You don't use safety stock all the time, but you pay for it all the time," says Billington. Buyers could use exchanges to build portfolios of options on supplies or even time on manufacturing equipment, then take delivery or trade as

**PRIVATE EXCHANGES are
attractive because they're efficient.
There's direct communication
between suppliers and customers.**

PUBLIC EXCHANGES provide standards for describing data and processes, making the job easier and less expensive.

their needs dictate. A similar concept is already in play on exchanges that trade bandwidth, Billington says. Telecommunications companies such as Arbinet use exchanges to sell minutes of capacity. "Once we get the right unit we transact in, that we can hedge in. We're creating markets that are transparent or nearly transparent," he says. "The efficiency gains are huge."

Bud Mathaisel, CIO of Soletron—a competitor of Celestica—thinks public exchanges can help him save money by connecting to each of his company's 8,000 suppliers and 300 customers, as it costs between \$10,000 and \$500,000 to enable each private connection. This expense includes mapping each transaction and the supporting data on both his and his partners' systems. Add to that the cost of keeping those interfaces up to date and soon it could cost Soletron more than \$80 million to build and support a completely integrated, private, Web-based trading network.

Public exchanges provide standards for describing data and business processes, making the job easier and less expensive. "The idea would be for Soletron to build one bridge between us and the public exchange and for all our trading partners to do the same, and then it's done," says Mathaisel. More than 200 of Soletron's suppliers transact business with the company electronically. "That's an expense we'd like to take out of the system, and one way is to have public exchanges reduce individual connection costs." Companies could use that infrastructure for private business as routinely as they discuss confidential matters on the phone. (Soletron is a founder of both the Converge and E2Open exchanges.)

Mathaisel thinks the current enthusiasm

for private exchanges stems from the immature capabilities of public trading hubs and questions about their ability to stay afloat. Public exchanges, whether they're owned by a consortium of industry members or independent investors, depend on fees collected from users to finance operations. Almost none of them are making money,

and most are still building the systems that are supposed to deliver the greatest value to members.

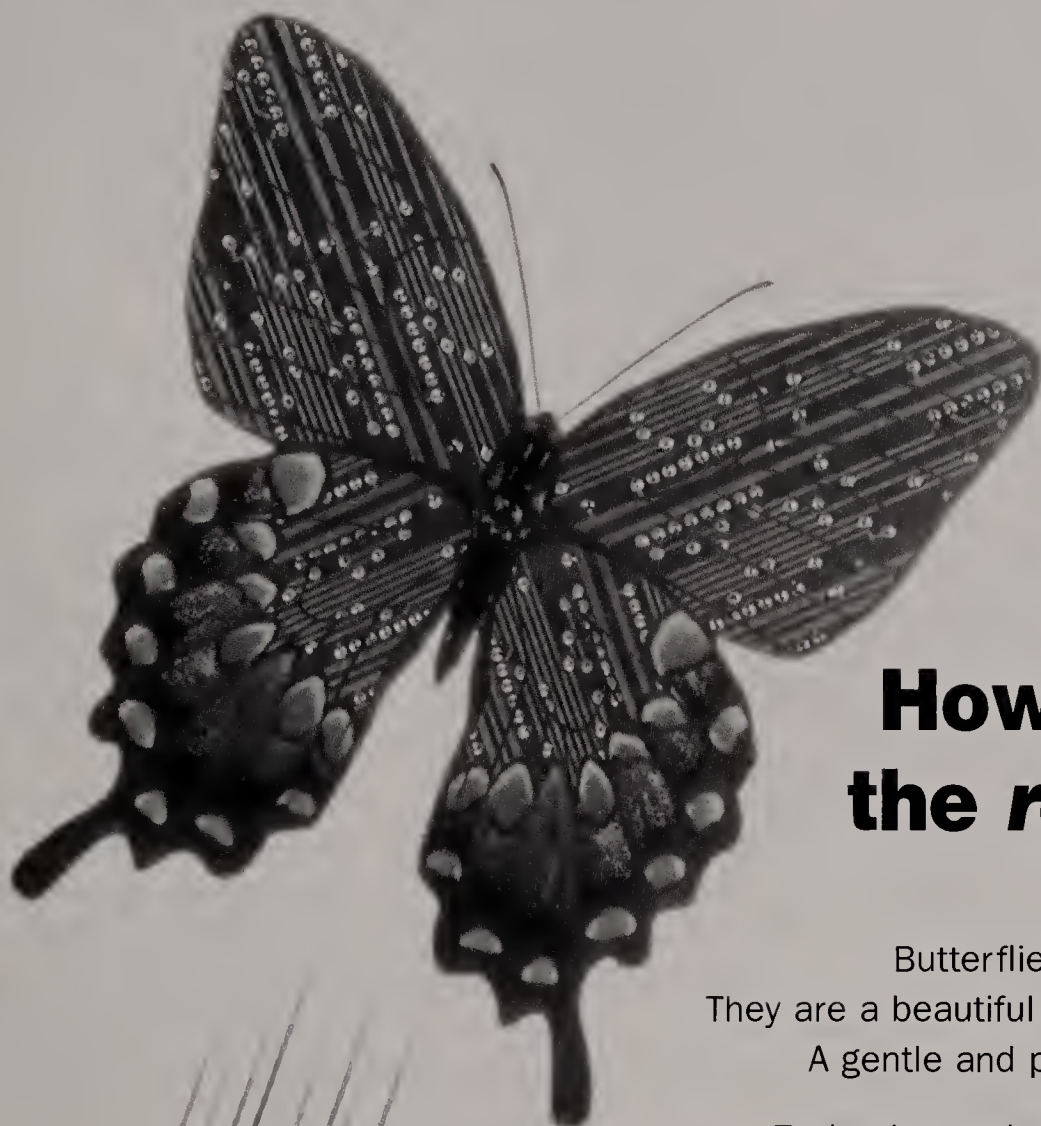
Soletron has been using public exchanges the same way as HP and Celestica. "We're doing basic trading," Mathaisel says. "It requires nothing special, other than standard Web connectivity." Buying components from a public exchange isn't new. Soletron has long been a customer of the New England Components Exchange, a parts exchange that existed before the Web, and was recently purchased by Converge.

Mark Jenkins, Soletron's director of e-business, says the company has been working with one customer to conduct its order management through one of the

The relatively low cost of public exchanges helps Soletron CIO Bud Mathaisel save money connecting to customers.



PHOTO BY JAY WATSON



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exchanges, collecting information about changes in demand for products and providing the customer with data on Soletron's inventory (he wouldn't name the customer or the exchange). It's a small step, but a definite improvement over the previous process, which involved faxing and e-mailing data, says Jenkins. Now there's a single online record of order quantities and related data accessible to both companies.

Mathaisel acknowledges that some key customers show no sign yet of wanting to use public exchanges. So Soletron, like Celestica, is working with six large customers on private exchanges and has set up a website for suppliers to share planning and inventory information with Soletron's systems. "The major multinationals have invested millions of dollars in developing proprietary supply chain processes," observes James Hatcher, director of e-business and supply chain Asia Pacific for global manufacturer QAD. "That's part of their competitive advantage."

PRIVATE, PUBLIC OR BOTH?

Your readiness to share data outside your company is one factor that will determine whether you participate in public exchanges or stick to private networks. Even companies with fully integrated internal supply chains may not have business processes to support exchanging data with trading partners. That's another reason why private hubs are so popular right now.

"Private exchanges are evolving more rapidly because that is taking baby steps instead of giant strides," says Rakesh Sood, general partner of Sprout Group, a Menlo Park, Calif.-based VC company affiliated with Credit Suisse First Boston Corp. "Communities will evolve," he says. "At some point you'll need to connect to other things out there—maybe a logistics hub or a payment processing hub." First, companies have to determine what it takes to build those connections and the respective ROI. These experiments are more likely to happen in a closed environment.

Public Exchanges: Safe Bet or Risky Business?

Participants agree public exchanges are valid in concept, if not execution

WHEN DAVE EVANS WAS WORKING on the launch of World Wide Retail Exchange (WWRE) a couple of years ago, he and colleagues from other consumer goods retailers believed a public exchange would let them pool their product demands to improve discounts and transaction efficiencies. Evans was the CIO of J.C. Penney at the time.

A year and a half after it debuted, WWRE now supports auctions, catalog orders and bid solicitations from suppliers. It's also testing systems for sharing sales forecasts. However, the promise of a one-stop marketplace where retailers would collaborate to buy T-shirts and shampoo is losing its luster. "There's a lot of software needing to be built that doesn't exist," says Evans, who retired in February.

In the meantime, retailers and manufacturers such as Target and Coca-Cola are hedging their bets by building private exchanges to connect with suppliers and customers, says Julian Chu, director of retailing and consumer goods with consultancy Mainspring, an IBM company in Cambridge, Mass. Coca-Cola also helped found Transora, a public exchange for consumer packaged goods manufacturers, and wants to get bottlers and customers to share real-time sales and promotion data, although strategic functions like these are better suited to a private forum, says Chu. "A public forum doesn't provide any competitive advantage."

Evans says both public and private exchanges are in many companies' futures. J.C. Penney's suppliers use a private hub to trade sales information, track inventory and exchange orders and invoices. "We all accept that the more visibility there is throughout the supply chain [about data like] how merchandise is performing, the better off we are," Evans says. He thinks having a way to reach numerous suppliers or customers through a public exchange can help the buyer get better prices and help the supplier lower sales costs. "Maybe we're still a little bit foggy about what the final form will take," but the concept, he insists, is still valid. **-E.V.**

Lam Truong, senior vice president and head of Seagate Technology's e-business strategy group in Scotts Valley, Calif., says that before his company uses an exchange to collaborate with its contractors and suppliers on product design it has to install a central repository for all the documents created in that process. Right now, there's no version control for engineering drawings or specifi-

cations that would be necessary if Seagate and its contractors need to rely on them without the benefit of explanatory e-mails or meeting minutes. Putting that repository into production will take a year, Truong says.

He wants to set up a private exchange on E2Open, of which Seagate is a founder. In the electronics industry, "70 percent to 80 percent of our suppliers are the same," Truong says. "We would ask [them], do you want to deal with each of us separately or deal with all of us the same way?" **CIO**

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Senior Editor Elana Varon writes about B2B e-commerce. Share your exchange strategy with her at evaron@cio.com.



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**J.P. Morgan Partners
CFO Marcia Bateson (left),
Managing Director Lisa Stein
and CIO Edward O'Connor built
a strong business case for their
IT modernization project.
They made sure employees
at the investment house
kept their eyes on the next mile
marker and celebrated each
success along the way.**

An Extranet Here, A Yankees Game There— It All Adds Up to a Project Win For J.P. Morgan Partners

BY ERIC BERKMAN

WHEN SHE JOINED the New York City investment bank Chase Capital Partners in November 1999, Marcia Bateson only had to glance at her assistant's desk blotter to see that her new employer needed to fix some important business processes. There, yellow sticky notes stood as records for dozens of big-dollar investments the company made daily via wire transfer.

Other spots around the office also screamed for improvement. At the end of the month, Bateson watched accountants gather by a Bloomberg terminal to jot down financial and market news they needed, which was then entered into Excel spreadsheets. Twice a year, the staff would mail Lotus Notes-loaded laptops to colleagues in offices around the world so that they could review and update information for the company's investment portfolio.

The sticky notes. The jottings. The laptop mailings. They all spoke of a frightening potential for record-keeping errors at a company handling billions of dollars in investments. Bateson, chief administrative officer and CFO at what is now J.P. Morgan Partners after the January merger of Chase Manhattan with J.P. Morgan & Co., realized the need for automated systems. That led to Project SAIL, a multimillion-dollar

ongoing effort to reshape J.P. Morgan Partners' technology infrastructure and accounting systems and to enable automated tracking and reporting of its global investments portfolio.

A year and a half later, Project SAIL has come a long way and remains on course. Segments completed on time include:

- Electronic tracking of wire transfers and direct feeds of stock updates from the Bloomberg wire into J.P. Morgan Partners' database about public companies.
- A secure worldwide extranet for reviewing and updating information on portfolio companies (see "Your Laptop Is Not in the Mail," Page 104).
- A database for searching the pipeline of pending deals by industry, region and investment professional.

While J.P. Morgan Partners has had to overcome some challenges—and there's more to do—Bateson, CIO Edward O'Connor and other executives attribute the positive results thus far to a three-pronged philosophy: Have IT

Reader ROI

- Learn how J.P. Morgan Partners built a strong case for automating business processes
- See the benefits of splitting a project into small bites
- Understand the importance of tending to your project team's morale

staff and business unit colleagues work hand in hand to develop applications; break the project into small deliverables, celebrating successes along the way; and when possible, choose vendors in which the bank has invested.

Because the project alters every worker's job, effective management takes some cheerleading, says Bateson. "We're changing every aspect of every person's day. So we've had to be messiahlike and think about changing the world. We've needed everyone's hearts and minds, not just bodies, pulling data."

THE BUSINESS CASE

Building the case for the project started with business needs, according to Bateson and Controller and Managing Director Lisa Stein. First, accurate information is a must for J.P. Morgan Partners, whose main activity is investing in promising companies. It collects information

J.P. Morgan Partners hit the trifecta for justifying a big IT project: outdated business processes, weak technology and the urgent call to compete.

about those companies to manage its investments and measure performance. Since it's a bank subsidiary and has foreign affiliates, J.P. Morgan Partners is accountable to its investors but also to federal and overseas regulators.

Second, the business needs information fast to grow in its competitive field. What was a portfolio of 600 companies under Chase Capital Partners in 1998 now covers more than 1,400 companies and \$23 billion in assets. And since the IPO market exploded in 1999, J.P. Morgan Partners' public holdings have grown from 50 securities to more than 100. Third, Internet-based communications mean that J.P. Morgan Partners' researchers and decision makers need to be able to act quickly to compete. To turn business intelligence into investment decisions, Bateson says, "most firms have a quarter. For us, it's shrunk down to a month and—in some instances—a day."

And finally, a modernization project was a chance to gain a competitive edge, Bateson says. Eighty-five percent of private equity companies do their accounting and reporting manually off of Excel spreadsheets, according to an Accenture survey of 100 private equity companies. CIO O'Connor's rationale: "We were using a highly manual process for jobs that required scalability. We were using Post-it notes and Sneakernet."

Last spring, Bateson and Stein made those points to J.P. Morgan Partners Managing Partner Jeffrey Walker and J.P. Morgan Chase management. "It wasn't a particularly hard sell," Stein says. "The project had to proceed because of the increasing volume we were facing and the increasing complexity being added—as well as the shorter turnaround time being requested, if not required, by all our constituents."

ALL TOGETHER NOW

With the go-ahead, Bateson and Stein assembled a team of about 20 IT workers and investment and accounting professionals. This group would develop the applications for the initiative dubbed Project SAIL. SAIL is an acronym for scalability, A+ controls, information at the point of need, and ability to leverage information, turning data into insight.

Even before the company could begin using the applications, though, its first step was overhauling J.P. Morgan Partners' network infrastructure to handle the applications the executives envisioned.

Marcia Bateson insisted that J.P. Morgan Partners pair business users with IT staff to test applications and seek improvements. And she advocated throwing parties for goals met.

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It was also vital, Bateson says, to put important information in one place for end users to access. One result was a system simplification: The company installed a Citrix terminal-server environment, which lets users all over the world access the same database. That replaced a combination of distributed servers and mainframes the bank used in the past.

IT and business cooperation is crucial, says Bateson. No application can help the business unless IT understands how the relevant business unit works. So for each application, she assigned someone from IT to lead the technology aspect and someone from the relevant business unit to take charge of that application's content.

The project designed to automate accounting systems, for example, tracks investments made by J.P. Morgan Partners on behalf of third parties and business partners, whether they're pension funds, major corporations or wealthy individual clients. J.P. Morgan Partners not only has to do accounting for investments it makes, but it also needs to accurately allocate the returns on those investments among the various third-party partners who hold a stake. At the same time, ownership stakes may be governed by complicated partnership agreements. In the past, the staff performed those calculations.

To automate that process, known in-house as partnership accounting, Bateson tapped coleaders and told them "to think of

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yourselves as joined at the hip." IT Project Manager John Blevins and Ann Marie Farah and Mounir Nahas, heads of accounting and reporting, continue to lead that ongoing piece of Project

SAIL. To Blevins, it was an invigorating experience. "We didn't look at it as a project that was technology-driven but as one that was for the benefit of the business," he says.

QUICK VICTORIES

As the accounting system and IT infrastructure initiative demonstrate, Bateson did not approach Project SAIL as a single monolithic project. The J.P. Morgan Partners team members broke it into more than a dozen small pieces, and they created frequent deliverables, celebrating each success along the way (by taking a trip to a wine bar and a Yankees game, for example). That is important to keep momentum going on a large initiative—and to keep staff motivated, Bateson says. "If you say, 'We're going to get from point A to point B' and engage in scorched-earth tactics to get there, that's no good," says Bateson. "But if the journey is pleasant and still results in a changed world, it's a positive experience."

Another big piece of that strategy is to take tasks that can be quickly and easily automated, creating early successes—and early celebrations—whenever possible.

One example is a deal-tracking system that is Web-enabled and

Your Laptop Is Not in the Mail

How building a secure extranet ended a bizarre business practice while demanding some tricky project management

TWICE A YEAR, J.P. Morgan Partners' investment associates and affiliates update the outlook, financials and board seats of every portfolio company to determine upcoming investment decisions.

In the past, it could take two associates working full time for five weeks e-mailing different versions of Word documents back and forth; then they'd manually enter all the completed updates.

The interim solution was a Lotus Notes-based system that tapped into a more centralized repository. That was fine for associates in the company's New York City offices, but some affiliates didn't have Notes and were too remote. So the company would mail Notes-enabled laptops to them, and they'd send the laptops

back after making the updates.

To change this process, J.P. Morgan Partners worked with Syncata, an El Segundo, Calif.-based systems integrator, to build a secure extranet that could be accessed from anywhere in the world. This project was tough to pull off in the 100 days available.

Aloke Nath, Syncata's chief strategy officer, says the time crunch—it typically takes six or eight months to deploy a global extranet—forced his developers to adapt on the fly. Syncata has a formal development methodology that calls for interviewing users on how they work—and then conducting an analysis and design phase. Some interviews gave way to a behind-the-scenes study of the existing

system. And the developers began testing before completing construction.

The extranet team also postponed features. For example, after the investment professionals update the company profiles, the updates are supposed to be uploaded into J.P. Morgan Partners' accounting system. The team decided to forego that part in its first implementation to meet the deadline, says Nath. And Syncata needed 12 developers instead of the usual seven or eight.

Syncata and J.P. Morgan Partners implemented a virtual private network that allows the sharing of encrypted data taken from a special, pared down database at J.P. Morgan Partners' offices. The database, which is in a different location than the company's website host, contains only information needed for the financial review.

J.P. Morgan Partners completed the extranet on time. And now, there's no more laptop mailings. **-E.B.**



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can be accessed anywhere in the world so that J.P. Morgan Partners' staff can track the pipeline of investment opportunities. Investment professionals can search by company, industry, region or person to see what deals J.P. Morgan Partners are working on, which areas have high-volume activity and who might have handled a transaction similar to one they're currently working on. Associate David Hang says this is a big time-saver. "It also helps for staffing," he says. "Staffers can look and see what different people are working on. If someone's too busy, we can avoid giving them new assignments."

Before installing the automated system—an early quick-hit piece that was up and running by mid-2000—anytime an associate wanted to examine the pipeline of deals in a particular category, he would have to initiate a "fire drill." Someone would send an e-mail inquiring about a particular industry, for example, and people from all over the world would respond by sending back spreadsheets, which the recipient would put together and try to manipulate. "Now they have real-time knowledge of the pipeline just by clicking into the database," says Bateson. And implementation was fairly simple—the only issue was training investment professionals to log all pending deals into the system. So most professionals felt that adopting the system would make their lives easier, says Hang.

Another quick hit has been the automation of wire transfers. The Project SAIL team rolled out an existing application that already

Step by Step

How project leaders and vendors managed J.P. Morgan Partners' IT modernization effort

- Identified project goals tied to business needs.
- Focused first on a simplified network systems infrastructure.
- Assigned teams of business and IT employees to test applications.
- Set interim project goals.
- Celebrated successful outcomes (wine bar trips, Yankees game, office parties).
- Increased staff where needed.
- Worked overtime when necessary.
- Scaled back some project goals to meet business deadlines (with plans to return later to finish).

had been developed for J.P. Morgan Chase. A system that replaced the dreaded yellow stickies allows investment professionals to enter information onto an Excel-based form, press a button, and then it's uploaded, reviewed and processed. In addition to reducing the risk of error, it's cut down the time it takes to do year-end audits. "We project we'll get almost all of our year-end audits done one to two months earlier than last year," Stein says.

BITE-SIZE PORTIONS

Not everything has been so easy. For example, the partnership accounting application, which tracked investment shares owned by third parties, was broken into phases. The first phase—the automation of the investment accounting piece, which involves breaking each investment into the proper ownership proportion among various J.P. Morgan Partners' legal entities—was implemented in a round-the-clock big bang conversion during Martin Luther King Jr. weekend.

In the weeks leading up to the conversion, application developers on the Project SAIL team were putting in 80- to 100-hour weeks. And once they reached the big bang weekend, 40 to 50 people from the team and Miami-based software company FTI worked around the clock to make sure the investment information was allocated into all the proper fields at the push of a button—and to ensure that the manual calculations didn't vary from the automated calculations.

Edward O'Connor, who left a consulting job to join J.P. Morgan Partners, represents one facet of the company's project management strategy: Turn your vendors into partners.





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Lisa Stein figures J.P. Morgan Partners' IT project will speed up year-end audits of the company's investments by two months.

The conversion was so all-encompassing for those involved that IT Project Manager Blevins brought his wife to watch him watch the screens. "I guess you can call that a bit of work-life balance," he says.

The company celebrated the success with a party, complete with drinks and hors d'ouvres, and Bateson invited vendors from other pieces of the project to celebrate too. A big goal of hers was to make everyone involved—vendors and J.P. Morgan Partners staff alike—see Project SAIL as a singular project changing the shape of the company. So when one piece was completed, everyone would join the victory party.

"People were relishing the accomplishment of a goal and not thinking where they came from," says Bateson. "That was a good thing. You want people not worrying about their own personal agenda, instead focusing on the agenda we've *all* committed ourselves to."

USE VENDORS YOU KNOW

The Project SAIL team selected vendors whenever possible from J.P. Morgan Partners' investment portfolio. Bateson says that while the pressure is not overt to do so, there's a benefit of working with a company in which you've invested. "You get to see, as a client sees, what you own," she says. "You're eating your own dog food, so to speak. You get to be a client and owner at the same time."

Of course, it's not a perfect view. A vendor may be more likely to mind its P's and Q's for a major investor than it is for Joe Customer. But is extraordinary service such a bad thing? Besides, "it's better than the view I'd have if I wasn't a client at all," says Bateson. "And is any client experience wholly representative?"

Examples of vendors involved in Project SAIL, in which J.P. Morgan Partners holds a stake, include:

- Trigyn Technology, formerly eCapital Solutions, a company based in India, helped develop the deal-tracking system to monitor the pipeline of investments and opportunities.
- Greenwich Technology Partners in White Plains, N.Y., designed and implemented the new network infrastructure. Also the former home of J.P. Morgan Partners CIO O'Connor.
- Syncata, an El Segundo, Calif.-based software developer and systems integrator, helped create a secure extranet for J.P. Morgan Partners' biannual review of portfolio investments—putting an end to mailing laptops around the world.

These contract awards were not sure bets. Syncata, for example, had to outbid three other portfolio companies and a Big Five accounting and consulting company to win the extranet project. But its status as a portfolio investment helped.

WHAT'S LEFT

There's still more to do on Project SAIL—particularly that partnership accounting application—and more challenges to overcome.

That partnership piece, where the returns are allocated among third-party investors, is behind schedule and won't be in place until later this fall. Bateson and her staff didn't realize how complicated it would be for the system to analyze the partnership agreements and to make sure the right amounts are all entered into the right fields. "We underestimated the complexity of establishing logic from legal agreements that are 2-inches to 3-inches thick and translating them into something that can be written into code," she says.

But this delay hasn't compromised the rest of Project SAIL. "It came pretty far in, and we'd delivered on some other stuff," she says. And once it's ready, it'll make a huge difference. "It'll take us from 15 entries to one entry [each time we make an investment]," she says. **CIO**

Eric Berkman (eberkman@cio.com) is interested in hearing about IT projects at your company that change the way you work.



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The Selling Game

Wherein our reporter goes deep into sales territory to learn how sales reps move CIOs from pitch to contract

BY SCOTT BERINATO

DURHAM, N.C.—Edd Brown is having a few problems this morning. His assistant is AWOL, which means no coffee, no hotel sticky pastries and no one to register the baker's dozen of us who have signed up for Solution Selling, the software sales boot camp being held at the local Marriott. Edd registers the 16 male and eight female sales reps who have shown up, then stands in the middle of the room. Edd, a former salesman himself, is running the boot camp, and he begins with the basics: "Power buys from power." "Act like an equal, and you'll be treated like one." "Sell to executives, not IT." This is also known as the California Rule—get high, stay high. And don't control the buyer, control the process.

Reader ROI

- ▶ Learn what's behind the basic sales script
- ▶ Discover how to resist pressure tactics
- ▶ Figure out how to turn sales plays to your advantage



We are sitting in a “U” around Edd, who uses paper on an easel and an overhead projector to walk us through his 53-page presentation. Maybe it’s because of the lack of coffee and Danish pastries, but immediately there’s cranky skepticism.

One salesman, who identifies himself as Mike, says, “We all know this. But every time you call, everyone here knows, your stature gets a little smaller.”

Edd pads over to Mike’s seat and presses an ink stamp of a lightbulb onto his paper nameplate. The lightbulb is intended to encourage participation, and it’s Solution Selling’s logo.

“Maybe it’s time we stop saying *salesman*,” says another cadet, whose nameplate is out of view. “Maybe we should be value brokers.”

“We have all sorts of names. Pond scum. Liars. Cheaters. Thieves,” says Edd. He sounds like he’s been through this before. “Let me offer this. Where would *they* be without sales?”

Mapping the Buyer

The “they” Edd refers to are, of course, corporate executives. The CEO, CIO or Senior VP of Whatever, and Solution Selling has this buyer mapped.

Solution Selling was founded by Mike Bosworth, an ex-salesman who based his courses around research into the buying and selling process. (The company was recently acquired by Provant, a Boston-based provider of performance improvement services and products.)

According to Bosworth’s research, 13 percent to 20 percent of the companies that buy software are innovators or early adopters, and sales reps don’t need to fight their way into these places; the software sells itself. Sixty-eight percent are either early majority or late majority buyers. It takes a skilled salesman, an “eagle,” to open this person’s purse. The rest, 5 percent to 16 percent are laggards who aren’t worth the bother.

Only 20 percent of all companies are even looking for software. The other 80 percent are window-shopping. Boot camp is all

about getting that 80 percent in the store and buying. If the salesperson can get a sponsor inside the company, 70 percent of the time that sponsor will introduce the salesperson to the “power sponsor”—the one with the money and influence to buy software.

No Pain, No Gain

As frazzled as Edd was at the start, he soon collects himself and quickly lays out the tactics of a successful sales battle: “We’re going to use the word *pain* throughout the day. Buyers try not to focus on their latent pain. We’re going to help you pull their pain from the back of their minds and put it in the forefront.”

The sales reps in Meeting Room 105 have paid \$295 and round-trip airfare to Durham, the home of Duke University, to locate that pain. And to learn how to negotiate without caving in on price, how to shorten the sales cycle and how to tilt the playing field in favor of their software.

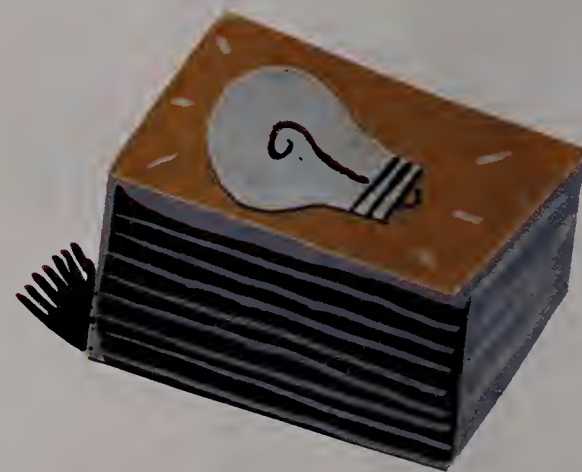
“Sales is a hurt-and-rescue operation,” Edd expounds. “You’re hurting them in order to rescue them. You have to hurt them first, make them focus on their problems.”

Edd is neat but not overly so in black shoes, black Dockers and a basic blue shirt opened to expose a black T-shirt. His face is boyish, though he must be close to 40. His hair is as straight and as unremarkable as the conference room.

“I’m going to rock your boat,” he says. “I’m suggesting today you take steps you might think will kill your sale.”

For example, on setting up the first meeting: “You actually look better if they ask you ‘How’s 3 on Thursday?’ and you say ‘I’m

The sales reps have paid \$295 and round-trip airfare to Durham to learn how to tilt the playing field in favor of their software.



booked.’ Even if you’re not,” Edd says. Some are looking at him quizzically, so he reminds us, “Power buys from power.”

Later, we review a litany of reasons that it’s hard to sell software. There are 14 of them listed on Page 10 of his presentation. Edd treats them as excuses. One is “They wouldn’t let me in at the right level.”

“Oh, I hate this one,” Edd starts. “Who’s barring the door?”

My classmate Margherita, eager to participate, misses Edd’s rhetorical tone and shoots back, “The secretary.” Her answer draws a few snickers, but she gets a stamp.

The Sincerity Script

Much of the day is devoted to scripts. There are scripts for everything from cold-calling (phone prospecting, Edd calls it) to creating in the CIO’s mind something called a capability vision. That’s a script whereby the salesperson gets a CIO to talk about her pain in a way that will make the salesperson’s product seem crucial to buy. Say a sales rep is trying to sell antivirus software. His script might sound something like this: “When a virus hits your network, would it help if you had software that automatically detected and quarantined the virus?” Seventy percent of the time a CIO will answer yes, and the hard part is done.



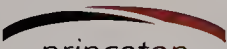
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There's even a script for references—a customer testimonial. The references build trust, which Edd defines as “sincerity plus competence.” Edd says, “Of course, these references have to be real because they may ask ‘Who was that?’ or ‘Can I talk to that customer?’ What do you say to that?”

“The truth.” Stamp.

“The truth, yes. Always the truth,” Edd says. “But what specifically?”

No one answers, so Edd does. “Here's what I suggest: You say, ‘You know what, that's confidential, but if it makes sense for us to go forward, I will ask them if I can reveal who it is, and I will also keep your information confidential.’ I am showing power buys from power. I already have permission from the testimonial customer but...”

“Wait! Then that's not the truth.”

“He doesn't have to know that. I don't



want to give anything for free. Always quid pro quo. I'm establishing he's a big shot, but I'm a big shot too.”

By far the most elaborate script is the Nine Block Vision Processing Model—which walks the seller through a start-to-finish sales questioning process. Crudely summarized, the first six blocks create the hurt. The last three suggest a rescue.

A CIO can spot a sales rep walking through the nine blocks by noticing certain

cues. The sales rep won't mention specific products and will phrase everything in the form of a question. And the questions follow a pattern. Open-ended questions, then more focused queries and last, summary questions to get the CIO to repeat back his needs to the sales rep.

“You want to get it out of their mouths,” Edd says. “When you're in the seventh block you ask, ‘How do you see yourself solving the problem?’ They say ‘I figured that's why you called.’ Perfect. They just opened the door so you can drive a big truck of products in.”

CIO = Career Is Over

In the afternoon, Edd realizes he hasn't introduced himself. His background is far less scripted than the course. He's from a family of lawyers. He started a career in social services. He left that and sold Lexis-Nexis to law firms for 10 years. “If I could spell *modem* they thought I was real technical,” he says. From there, he moved to Internet software sales. He also tried to sell to National Public Radio because, he says vaguely, he once worked in radio. Now, Solution Selling contracts him to run Software Sales Rep Bootcamp.

Edd loves role-playing. When we prac-

“Sales is a hurt-and-rescue operation,” Edd expounds. “You're hurting the CIOs in order to rescue them.”

tice cold-calling scripts, he plays the prospective buyer. As CTO, he draws up his pants into high-waters. As VP of engineering he requests a pocket protector. As VP of HR, he says playfully, “I'm always in a meeting, planning a picnic.” “CIO,” he says. “You know what that stands for? Career Is Over. The average CIO lasts 18 months in a job.”

By the time Edd gets to the art of closing a deal, much of the skepticism in the room has evaporated. Most of the attendees are furi-

ously scribbling notes. In the far corner, John asks Edd to repeat one sentence so that he can get it verbatim in his notes.

Edd swings into what he considers the clincher, the meeting that sales reps set up supposedly to review a rough draft of the sales proposal. It may sound innocuous, but this is an ambush. At this meeting, the sales-

person will suggest that if there are no objections to the rough draft, why not make it a final draft, sign off and get going on the project? “You will have an extra copy [of the sales proposal] handy,” Edd says. “You want to make this the final close. You want it to be a nonevent. You're trying to close at this meeting because they don't have their negotiating shoes on.”

If the salesman has done his job, the sale is closed right here. Done. Finis.

Edd pauses, then asks, “Do you know the person who invented this tactic? Who every year made his 12-month quota by the end

of January doing this?” John calls out, “Ross Perot?” “Yep!” exclaims Edd, as he darts across the room to give John his fourth lightbulb stamp. “I don't care what you thought of him as a presidential candidate, he was a hell of a salesman.” **CIO**



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GETTING ALIGNMENT RIGHT

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This October also marks a special milestone: our 25th *CIO Perspectives*® conference. Do plan to join us, and add your voice to the vision.



Agenda

SUNDAY, OCTOBER 14 - TUESDAY, OCTOBER 16, 2001

Sunday, October 14

8:30 AM - 1:30 PM

Golf Tournament at the Gary Player Course

Hosted by Lockheed Martin Global Telecommunications

2:00 PM - 5:00 PM

Registration

6:00 PM - 8:00 PM

Welcome Reception

8:00 PM - 10:00 PM

Evening @ The Improv

Hosted by Information Builders, Inc.

Back by popular demand! Information Builders again treats us to an evening of hilarity with performers from the world-famous Improv Comedy Club in LA.

Monday, October 15

7:15 AM - 8:15 AM

Breakfast & Informal Roundtable Discussions

8:15 AM - 8:30 AM

Welcome & Opening Remarks

Gary Beach

Group Publisher

CXO Media Inc.



8:30 AM - 9:15 AM

Aligning Clicks and Bricks Strategies

Moderator: Dr. Jim Wetherbe

Professor of IT, Texas Tech University



Organizations are having to make critical, strategic decisions on how to position their Internet strategies with their traditional brick and mortar business. Similarly, organizations that were primarily Internet businesses are having to grapple with brick and mortar support strategies. The most important issue is how and why customers are choosing between click versus brick as they make purchases. Wetherbe presents research results from the newly-founded Institute for Internet Buyer Behavior to help organizations align their click efforts with their brick efforts to achieve the best results from the marketplace.

9:15 AM - 10:15 AM

Developing Relationships that Grow the Business

J. Brian Ferguson

President, Chemicals Group, Eastman Chemical Company

Roger K. Mowen

Vice President, Global Customer Services Group and CIO, Eastman Chemical Company



Eastman Chemical Company has undergone a transformation - changing the way it and the chemical industry does business. With a four-point e-business strategy as its guide, the company has implemented, and invested in, new technologies and Internet capabilities designed with one purpose in mind - make it easier for customers to do business with Eastman. This transformation did not happen overnight. It took vision, commitment and leadership from the CEO down to managers at the operational level. Brian Ferguson and Roger Mowen discuss the company's e-business strategy and how they worked together to achieve a common goal - turn an old-line chemical company into a quick, nimble e-business leader committed to the needs of its customers.

10:15 AM - 11:00 AM

Business & Technology: A Strategy for Staying in Sync

Andrea Anania

Senior Vice President and CIO, Cigna Corp.



Today's fast-paced e-business marketplace has made it more important than ever for business and technology leaders to be on the same page when it comes to investing in and using technology to achieve business objectives. This presentation describes a smart strategy for ensuring that all the business and technology basics are covered while exploiting everything e-commerce has to offer today's evolving companies.

Coffee Break

11:00 AM - 11:30 AM

Business Briefings/Case Studies

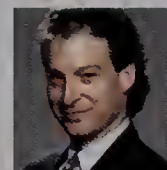
11:30 AM - 12:15 PM

Business Briefings/Case Studies

12:25 PM - 1:10 PM

Working Lunch
Dr. Rick Brinkman

1:15 PM - 2:45 PM



Co-author: *Dealing With People You Can't Stand – How to Bring Out the Best in People at Their Worst*

Do you work with people who waffle about decisions? Or who try to intimidate you? Or who constantly say "That won't work," or "It's not my fault?" Dr. Rick uses both wit and wisdom to identify the ten types of difficult people we all have to deal with – and shares proven strategies for getting positive results from these hard-to-handle colleagues. (Will you recognize your CEO, CFO, VP of Human Resources – or even yourself?)

Business Briefings/Case Studies

2:45 PM - 3:30 PM

Where Should eCommerce Live within the Hierarchy of an Enterprise?

Janey A. Place, PhD

Executive Vice President, eCommerce Strategy, Mellon Financial Corp.

3:30 PM - 4:30 PM



CTOs and CIOs are being charged with making costly and critical business decisions, but where is the majority of the value being added and what strategies will maximize that value? How can organizations balance IT expertise and business expertise in developing an e-commerce strategy and what role does the IT department play in that? With IT departments as large as 2700 people, how do you get everyone to understand, accept and begin acting in a new role with the speed that is now required by customers?

Co-evolving Business & IT Strategies

Robert M. Cohen

Vice President, Information Services and CIO, AstraZeneca

James Pusey, MD

Vice President, Marketing, AstraZeneca

4:30 PM - 5:30 PM



Often in IT, we speak of aligning IT strategy with business strategy. While alignment is important, one of the most successful IT strategies is defined when IT and business strategy mutually shape each other. Cohen and Pusey discuss the difference between strategy alignment and co-evolved strategy, the process for getting there, the prerequisites, the benefits, and personal experiences of lessons learned and successes.



Networking Reception

5:30 PM - 7:00 PM

Hospitalities

7:00 PM - 11:00 PM

Tuesday, October 16

Breakfast & Informal Roundtable Discussions

7:30 AM - 8:15 AM

Day Two Welcome

Moderator: Dr. Jim Wetherbe

8:15 AM - 8:30 AM

Winning the Talent Wars

Bruce Tulgan

Founder, RainmakerThinking

8:30 AM - 9:30 AM



There's been a fundamental shift in the employer-employee relationship: from the rigid, pay-your-dues and climb up the ladder model to the fast-moving, increasingly efficient free market for talent. Tulgan shares knowledge gleaned from in-depth and ongoing research on new attitudes of today's workforce, and talks about innovative solutions to align the work we need to get done with the new models.

Tuesday, October 16 (continued)

9:30 AM - 10:30 AM



Best Practices Exchange Panel: Getting It Right

Moderator: **Martha Heller**

Executive Web Editor, *CIO Magazine*

Panelists: **Mark West**

CIO, *Electronic Arts*

Mike Anderson

CIO, *The BISYS Group*

Paul Ingevaldson

Senior Vice President of International and Technology, *Ace Hardware*

It is easy to talk about alignment in general terms, but where do you start? Drawn from the CIO Best Practice Exchange, a private online network of senior IT executives, this panel of CIOs will discuss the real stuff of CIO/CEO collaboration — the tools, metrics, methods, and documents it takes to achieve true IT alignment. Moderated by Martha Heller, director of the Exchange.

10:30 AM - 11:00 AM

Coffee Break

11:00 AM - 11:45 AM

Business Briefings/Case Studies

11:55 AM - 12:40 PM

Business Briefings/Case Studies

12:45 PM - 1:45 PM

Networking Lunch

1:45 PM - 2:30 PM

Dessert & Host Displays and Networking

2:30 PM - 3:45 PM



Special Address: Leading at the Edge

Dennis N.T. Perkins, PhD

President, *The Syncretics Group*

In the chronicles of extraordinary adventures and against-the-odds survival stories, nothing compares to that of Sir Ernest Shackleton and his team of Antarctic explorers. Stranded in the frozen sea for nearly two years, the team endured extreme temperatures, hazardous ice, dwindling food, complete isolation, and perpetual blackness. Perkins, author of *Leading at the Edge: Leadership Lessons from the Extraordinary Saga of Shackleton's Antarctic Expedition*, shares what voices from the past can teach us about a group that remained cohesive, congenial, and mercifully alive despite seemingly insurmountable obstacles.

3:45 PM - 5:30 PM



Closing Keynote: Strategies for Creating New Growth Businesses

Clayton Christensen

Author: *The Innovator's Dilemma: When New Technologies Cause Great Firms to Fail*

In *The Innovator's Dilemma*, Christensen discussed why some companies fail or stumble when confronted with changes in technology or markets. What he found was that classically well-managed companies often do not respond to important changes in technologies and markets. They listen very attentively to their customers' needs, watch their competitors closely, invest aggressively in those new products and services that promise the highest profitability — but fail to see what in fact could kill them. Christensen discusses how companies that introduced disruptive technologies toppled the industry leaders, the patterns and strategies these companies developed that helped them achieve a higher probability of success, and what he has learned that can help you topple the leaders in targeted industries today.

5:30 PM - 7:00 PM

Special Reception with Dennis Perkins & Clayton Christensen

7:30 PM - 9:30 PM

The CIO Harvest Moon Dinner

9:30 PM - 11:30 PM

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SUNDAY, OCTOBER 14 – TUESDAY, OCTOBER 16, 2001

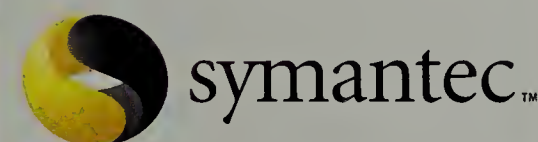
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To InfiniBand and Beyond

Should CIOs jump on this speeding bus? BY JOHN EDWARDS

IT ISN'T EVERY DAY that a new technology arrives that promises to boost connections to dazzling speeds, shrink the size of servers and perhaps even ease California's power crisis. And it certainly isn't every day that hardware and software vendors work together on a specification. Perhaps that's why InfiniBand—the result of

a collaborative effort—isn't just any technology. "It's definitely something big," says Tom MacDonald, general manager of Intel's Hillsboro, Ore.-based advanced components division.

Something big is what the InfiniBand Trade Association—a 225-company consortium formed by Compaq Computer, Dell Computer, Hewlett-

Edited by Christopher Lindquist. Send your thoughts and ideas for future columns to et@cio.com.

InfiniBand...training simulations...asset management

Packard, IBM, Intel, Microsoft and Sun Microsystems—had in mind last October when it ratified a specification that calls for removing I/O from individual machines and distributing it across a switched fabric. “The association wanted to create a network bus for the 21st century,” says Jim Bowers, a product manager at IBM’s microelectronics unit in Burlington, Vt.

InfiniBand is designed to replace the nearly decade-old PCI bus—a shared, general purpose interconnect—with a connection that can juggle several messages simultaneously and transmit each as if full network resources were devoted to it. In-

ter company to *CIO*’s publisher, CXO Media). “Yet the benefits and advantages are all there to be discovered.”

Banquet of Features

While most new technologies provide only a handful of benefits, InfiniBand promises an entire smorgasbord of new features and enhancements. Some of the tempting advantages include a fast and scalable transfer rate, intelligent channel adapters that offload much of the communications processing workload from the system’s processor, a modular design that can cut hardware costs, remote access capabilities for linking

InfiniBand’s supporters boast that the technology can eliminate the data flow bottleneck that’s inherent in the PCI bus.

finiBand’s supporters boast that the technology can eliminate the data flow bottleneck that’s inherent in the PCI bus and allow Internet data centers to take advantage of the new era of high-speed networks. Advocates also note that InfiniBand allows administrators to hook multiple servers together so that they can work as one—boosting performance and promoting efficiency. “Clearly the PCI bus is running out of steam,” remarks Dan Tanner, a senior analyst of storage and storage management for the Aberdeen Group, a Boston-based technology market research company.

But before InfiniBand can work any of its promised miracles, it must overcome several critical hurdles. These obstacles include the firmly entrenched technologies that would be replaced by InfiniBand, interoperability problems and a widespread—though largely unspoken—feeling among many CIOs that the status quo is good enough. “The killer application is not as clear-cut as one would hope,” says Vernon Turner, vice president of global enterprise server solutions at Framingham, Mass.-based IDC (a sis-

ter company to distant customers and suppliers, and improved load sharing management. Other features that allow IT departments to easily work with an array of transport media include virtually unlimited network expansion as well as direct support for copper, optical and printed circuit wiring.

InfiniBand will become a standard part of server motherboards by 2003, says Peter Urban, a senior analyst at AMR Research, a technology research company in Boston. He notes that Intel’s recently released 64-bit Itanium chip will be the first processor to adopt the technology. Vendors benefiting from the technology include Vio and Lane15, both in Austin, Texas, which create the software that makes InfiniBand work, as well as server makers that will be able to target more demanding applications. “Manufacturers of open databases, like Oracle, should also see performance improvements as the pipe between shared disks and nodes is fattened,” Urban says.

For CIOs, InfiniBand’s prime benefit will be greater computing capacity from comparable resources—or equivalent capacity

new products

Storage to the Max

Maxtor has announced the availability of the **MaxAttach NAS 4300** network file server. The unit fits into one rack space (1.75 inches) and holds 400GB of storage space. It has a number of features suitable for enterprises, including a gigabit Ethernet interface, the capability to immediately recover accidentally erased files, as well as compatibility with storage management tools from the likes of Legato, OTG and Veritas. Customers can also combine storage from multiple devices into a single virtual storage pool. Pricing for the unit is \$5,999. For more information, visit www.maxtor.com or call 877 692-3562.

Word on the Go

Blue Nomad has released the second version of its **WordSmith** word processor for the Palm OS. The software allows users to open, edit and create new Microsoft Word-compatible documents directly on their PDA. When opening a document created on a PC, WordSmith preserves formatting, including paper size, page orientation, margins, tables, images, footnotes and more. It offers a complete find-and-replace function as well as the capability to add footnotes,

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from fewer resources—because of a reduction in data-traffic congestion among hardware devices. The technology would also simplify a data center's infrastructure by presenting a common fabric to interconnect server, switch and storage components. "In doing so, the data center's operations dramatically improve its total cost of ownership," Turner says.

How much money will InfiniBand save its adopters? "This is hard to quantify today, since there are no benchmark or performance metrics to compare to," Turner says. Still, the technology's raw power—scalable transfer rates of 500MBps to 6GBps, compared to PCI's 132MBps to 1GBps pace—leads experts to believe that for most adopters the overall savings will be substantial. Urban believes that InfiniBand will be a better value than the status quo. "You get faster performing servers, which will translate to faster performing applications and better e-commerce," he says.

For all of its power, InfiniBand has a price that isn't expected to reach to infinity. Although it's too early to project system costs, InfiniBand technology isn't expected

paradigm shifts in the way we look at the three primary components of servers, storage and networks," says IDC's Turner.

One way that InfiniBand would disrupt the status quo is by supplanting an entire range of established standards. Besides PCI, InfiniBand promises to displace such familiar technologies as PCIx (an enhanced PCI bus), iSCSI (a storage networking protocol) and fibre channel (a storage networking standard). Businesses have made substantial investments in those technologies and will be reluctant to ditch them. Although InfiniBand servers may be able to work with some legacy products as soon as middleware vendors develop the necessary solutions, the new technology still represents a quantum change for CIOs and their staffs.

Even when faced with InfiniBand's numerous benefits, a number of CIOs will undoubtedly resist the technology, convinced that they simply don't need the new capabilities. But Lauri Vickers, a senior analyst at Cahners In-Stat Group, a technology research company in Scottsdale, Ariz., thinks that most of those CIOs will find themselves being pushed over to

For CIOs, InfiniBand's prime benefit will be greater computing capacity from comparable resources.

to significantly drive up server hardware prices, especially considering the performance advantages. "The pricing can't be excessive," says Urban.

With Closed Arms

Despite the growing hoopla surrounding InfiniBand, not everyone is welcoming the technology with open arms. Organizations with substantial investments in what will soon become legacy servers and related hardware are viewing the technology with a combination of skepticism and concern. "InfiniBand has the capability of being classed as a disruptive technology, causing

InfiniBand before too long. She compares the technology's introduction to the way PCI replaced ISA technology on desktop PCs several years ago. "Eventually, if you wanted the latest and greatest video card and you wanted the best sound card, you could only find them in the PCI format," she says. "It's something that just happens, whether you want it or not."

Interoperability headaches loom as yet another potential InfiniBand roadblock. Ambiguities in the InfiniBand specification, which leaves certain communications functions to vendor discretion, could create conflicts between products. But Alisa

new products

endnotes, comments and bookmarks. Color-device users can also take advantage of the software's FineType high-resolution font technology for sharper viewing. It supports a variety of Palm-compatible devices, including those from Palm, Visor, Edge, Sony, HandEra and TRGPro. The software also supports several external keyboards, allowing for easier data entry. The product costs \$29.95 per license with bulk licenses available. For more information, visit www.bluenomad.com.

Tiny Drive

If you need lots of extra space on a laptop, **Toshiba** may have an answer. The company has unveiled the **MK5002MPL** PC Card hard-disk drive—a 1.8-inch, 5GB drive that fits in a standard Type II PC Card slot. The drive offers transfer rates of up to 20MBps. Users merely slide the card into the slot to add gigabytes of new storage to their machine. The product comes with a list price of \$499 and a one-year warranty. A 2GB version of the drive is also available for \$349. For more information, visit www.harddrives.toshiba.com.

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Nessler, Lane15's president and CEO, doesn't believe that will develop into a major problem, since a wide range of InfiniBand vendors are already working with each other as InfiniBand Trade Association members. "I think you'll see vendors reach a consensus on interoperability issues fairly rapidly," she says.

Power Saver?

One InfiniBand attribute advocated by some supporters is the technology's potential power-saving capability—an important consideration for energy-conscious organizations, especially those with operations in California. There's no need for a network interface card between an InfiniBand server and an InfiniBand switch, Vickers says. "If you eliminate enough of them, you can start powering some homes."

PCI cards can consume as much as 30 watts of power, claims Eyal Waldman, chairman and CEO of Mellanox Technologies, an InfiniBand silicon provider in Santa Clara, Calif. "InfiniBand replaces those PCI cards and could potentially reduce power consumption by 33 percent," Waldman says. Vickers notes, however, that an organization would have to dump a lot of network cards to see any meaningful power savings.

Whether or not InfiniBand turns out to be a significant power saver, the technology's numerous other benefits appear to guarantee it a place on the acceptance fast track. IDC's Turner sees no reason why InfiniBand won't ultimately succeed. "I believe that the risks are for those not adopting this technology," he says. AMR's Urban is urging CIOs to wait on major server purchases, "because if you buy something right now, two years down the road the thing's going to be totally obsolete." Aberdeen's Tanner is even more succinct: "InfiniBand will become the industry standard." ■

John Edwards is a freelance technology writer based in Gilbert, Ariz. He can be reached at jedwards@john-edwards.com.

PREDICTIONS

asset management

Application Costs: The Long-Term View

I.T. MANAGERS looking to cut costs may find more than a few savable pennies hidden inside their applications. IT can often trim budgets by taking a long-term, asset management point of view on application costs, says Meta Group, a Stamford, Conn.-based company.

In an online presentation—available at Meta Group's website, www.metagroup.com—William Snyder, analyst for enterprise data center strategies, describes several ways IT managers can save money on applications.

- Upgrade all users—instead of just select groups—to new versions of software. It can save support costs, and it can also save money when the software vendor charges for old versions (as does IBM).
- Don't be driven to negotiate with vendors at the last minute. Instead, develop a five-year model and try to start negotiations at least one quarter before the purchase becomes necessary.
- Examine existing contracts closely before moving to new pricing models. Current contracts may have protections that you won't find in the new ones.
- Avoid five-year contracts. The current uncertainty in the software industry makes three-year contracts more attractive at the moment.

—Christopher Lindquist



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REVISIT

computer learning

Time for Training

Computerized simulations become a core part of business

BY FRED HAPGOOD

WHEN THE COMPUTER-BASED simulation market emerged 10 to 15 years ago, it came in three forms: strategy war gaming, design and training. Each had its own feature suite, user constituency and vendors. Strategy war gaming was played by groups, usually drawn from senior management, with the goal of exploring strategies for dealing with market conditions. Design simulations optimized the development of new products or enterprise processes. Training simulations educated new personnel about existing devices or environments (a flight simulator to train airline pilots, for instance).

The applications did have one thing in common: They all ran on the margins of the enterprise—with a small number of users—for short periods of time set aside for the purpose. They were gamelike, constructed versions of reality. Everyone understood the difference between real experience and sim-

ulations. "When experience is lacking, simulation can often take its place," we wrote in our first big piece on the subject ("Some Simulating Experiences," Nov. 1, 1993).

The years since 1993 have changed the picture in several ways. The various categories of the simulation technology, for instance, have begun to merge. Once a design simulator improves past a certain level of sophistication, for example, it almost automatically becomes a useful training instrument as well.

Ossining, N.Y.-based RSoft produces simulators that support the design of photonic devices and circuits. (Their tools keep track of the underlying physics to see if the design makes sense.) According to company President LuAnn Scarmozzino, until the mid-1990s both universities and optical design companies tended to write their own modeling software. As software makers like RSoft kept adding materials,



new products

Bluetooth Gets Real

TDK and Swedish mobile technology vendor **Tactel** have jointly announced the release of **Blue5**, a Bluetooth wireless snap-on for Palm V and Vx handhelds. The device attaches to the back of a Palm and allows users to wirelessly synchronize their PDAs with Bluetooth-enabled desktop and notebook PCs as well as gain access to e-mail applications, intranets and the Internet. Pricing for the product is \$200. For more information, visit www.tdksys.com.

Eyes Only for Notes

Companies interested in increasing their e-mail security may find help from **Zixit**, which has released the Lotus Notes version of its **ZixMail** plug-in that provides 1,024-bit encryption for Notes mail messages. (The company had previously announced a similar product for Microsoft Outlook.) Using the plug-in, customers can send and authenticate e-mail messages from within the Notes interface. The product works with Notes releases 4.5 and higher. Licenses start at \$24 per e-mail address, per year. For more information, visit www.zixit.com or call 214 515-7357.



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— Louisa May Alcott

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device definitions, and more elaborate examples and prototypes, however, their programs started to appear in educational contexts. Scarmozzino says that she often sees design simulators being used to retrain engineering talent, thereby allowing skilled personnel to transfer from design fields that are cooling down to ones that the enterprise is more excited about.

At the same time, the concept of optimization has spread from designing individual parts (where engineers may try to create maximum strength with minimal material) or processes (to keep maintenance costs on an assembly line at their lowest, for instance) to managing enterprises as a whole. That shift is made possible in part by the growing practice of equipping the elements of enterprises with sensors and network connections. (According to ARC Advisory Group, an automation consultancy in Dedham, Mass., by the end of the decade almost all physical control elements such as motors, switches and valves will be smart in this sense.)

The data generated by this "enterprise nervous system" lets managers continuously optimize routine operations such as maintenance cycles. "These days a simulator has to be seen as an integral part of the plant," says Tim Bradley,

more quickly and technologies grow more complex, training is shifting from an episodic activity that happens only during special times (before stepping into a new position, for instance) and locations (classrooms) to one that is continuous, constant and accessible on demand both in time and place. "Increasingly, training is being integrated into and generated by the enterprise knowledge management system itself," observes Nettie Longiotti, a project manager at VisionCor, a knowledge management company in Charlotte, N.C.

How fast these shifts develop depends in part on how much of enterprise life companies can incorporate into a single dynamic data model. That, in turn, depends on whether HR, marketing, finance and other departments—not only within a single company but also up and down the value chain—are willing and able to hammer out a common set of terms. For the moment, such cooperation is limited at best. (For instance, Scarmozzino would like her simulators to be able to read specifications data directly from supplier or vendor databases, a liberty that manufacturers in her sector do not currently permit.)

Nonetheless, for all the hurdles, there is a general expectation that simulations are moving from the edges of the work

Simulations are moving from the edges of the work experience to the heart of it.

director of dynamic simulation solutions at Cambridge, Mass.-based AspenTech, a vendor of integrated solutions for process industries. Bradley points out that with sufficient processing power, such simulations can run faster than real-time, giving managers a way to look into the future and see when problems—or opportunities—might emerge in time to do something about them.

These trends are running in parallel with another. As product lines turn over

experience to the heart of it. AspenTech's Bradley says that he expects managers in charge of constructing new facilities will soon run plant simulations first, and then let the steel-and-brick expression of that simulation follow as an afterthought. Should that happen, reality and metaphor would change places: The simulation would become the real thing. **CIO**

Do you have a topic that you'd like us to revisit? Send suggestions to et@cio.com.

new products

Instant Publisher

Web software maker **dtSearch** has announced the availability of its latest product, **dtSearch Publish**. The software allows users to quickly publish documents to CD, DVD or similar media. The product can also quickly mirror a website to CD or DVD. By combining dtSearch Publish with dtSearch Web in the vendor's Web Combo, customers can simultaneously publish a variety of documents to both the Web or an intranet as well as to local optical storage. The product allows users to search for documents, and it supports numerous formats, including HTML, PDF and XML. Pricing for the Web Combo begins at \$2,995 for 250 users. Other pricing models are available. For more information, visit www.dtsearch.com or call 800 483-4637.

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Opinion

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Culture Clubbed

If you think IT can unite cultures into one big, happy global community, you're probably part of the problem

BY CHET BOWERS

COMPUTER ADVOCATES LOVE to talk about technology's ability to foster communication and understanding among people from all cultures, backgrounds and parts of the world, and to unite us all in a single "global village." By providing a level playing field, in which everyone gets an equal voice, free from biases and stereotypes that arise in face-to-face communication, we can all be heard and empowered—or so the thinking goes. That certainly sounds nice and makes those who work in IT feel good. But it's also hopelessly naive. The fact is, computers reinforce a culturally specific pattern of thinking—namely, a Western one that marginalizes all others.

Our society believes that technology is culturally neutral—



that is, it can be used either mischievously by hackers or generously by people of goodwill, but embodies no values of its own. Whether it's a computer or a telephone, we tend to believe the technology itself is purely a medium. But is that really the case? Definitely not. Just as the inherent characteristics of a telephone select and amplify certain aspects of interpersonal communication (that is, voice) while eliminating the multiple nonverbal messages integral to face-to-face communication,

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the inherent characteristics of computers also select certain patterns of personal and cultural experience for amplification—while eliminating others. Much of what gets amplified are aspects of Western culture, partly because so many of the people who design technology are Western, but also because many aspects of alternative mind-sets simply cannot be digitized.

Western people tend to think of themselves as autonomous individuals, separate observers and manipulators of the external world. Other cultures see it differently, such as the Quechua Indians of the Peruvian Andes, who believe that all forms of life are part of a complex web of nurturing relationships, or the Chinese, who believe that identity and responsibility are rooted

Westerners think of change as linear, and computers embody that assumption.

in family. Most technology, however, supports the Western view by assuming that a single, independent user acts autonomously to make decisions. Westerners also tend to think of language purely as a conduit in a sender-and-receiver process of communication rather than a medium that encodes a vast array of cultural assumptions. Again, technology supports this view by treating language and data as purely objective units of information.

Westerners think of change as constant, linear and progressive (rather than cyclical or even circular, as some other cultures see it), and computers embody the same assumption—witness, for example, the numbering of successive versions (of software or documents) in neatly sequential fashion. Finally, Westerners tend to value sight over the other senses, and so they generally emphasize print over other forms of communication. Once again, IT has been built with the same preferences.

So Long, Community

Community is one of the biggest areas in which our Western-minded technologies are selling us short. Our long history of thinking of technology as culturally neutral and our unrelenting drive to keep changing have desensitized us to the importance of many of the ingredients that are essential to morally coherent and mutually supportive communities. TV and computers, for example, have brought on the demise of traditions such as family conversation around the dinner table, and many of us are just now beginning to realize it.

In addition, while there are culturally diverse approaches to community, there is a common set of characteristics that cannot be digitized without being turned into something abstract and devoid of layers of meaning. Examples include patterns of nonverbal communication; spoken narratives that carry for-

ward the moral values of the family and cultural group; mentoring relationships; ceremonies; and interactions with nature.

Take mentoring. It may be possible to have a website that lists the mentors in the community, and it may even be possible to exchange some e-mails with a potential mentor. But that is profoundly different from the emotional richness and life-shaping experience of being mentored in person, with all the verbal and nonverbal aspects that would be involved. Ceremonies that are the center of a cultural group's sense of community and experience of renewal are also beyond the capacity of computer technology. It may be possible to record such events on videotape, but that description cannot reproduce the experience of the participants.

The result is that online communities are fundamentally different from real ones. They enable people to communicate information with others who share mutual interests, but they lack the depth of meaning, accountability and culturally distinct patterns of moral reciprocity on which real ones depend.

So we're faced with a tricky double bind. We are becoming increasingly connected with other people through the exchange of information, yet we're becoming increasingly disconnected from the face-to-face interactions that are the basis of community.

Time to Log Off

So where is it all going? Right now, the future does not look good for cultural diversity, community or the environment, which is threatened by many of the underpinnings of the Western mind-set (see "Turning Green," April 1, 2000). The challenge is to learn how to develop and use information technology appropriately.

IT people need a broader, more culturally informed education that allows them to understand the cultural ramifications of the technology they create and use. Teachers and the rest of us need to be better educated in recognizing the cultural assumptions underlying IT. Perhaps we should also use technology a little less. Forget the e-mail for a moment, and speak with someone face-to-face instead. Become a mentor, and encourage children to interact with the natural world. Future generations will be glad you did. **CIO**

Do you think IT is part of the problem? Let us know at difference@cio.com. Chet Bowers, adjunct professor of environmental studies at the University of Oregon, is author of *Let Them Eat Data: How Computers Affect Education, Cultural Diversity, and the Prospects of Ecological Sustainability* (University of Georgia Press, 2000) and *The Culture of Denial: Why the Environmental Movement Needs a Strategy for Reforming Universities and Public Schools* (SUNY Press, 1997).



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Now Hear This

I WAS RECENTLY asked to participate in a panel discussion billed as “The Next Killer Application.” Fellow panelists were a who’s who of smart technologists, so I struggled beforehand to come up with a provocative concept that wouldn’t get me laughed off the stage.

When it was my turn, the panel moderator asked me for my pick as well as for a prediction as to when it would be a reality.

“It will be the age of v-computing, and we will be able to do it by 2005,” I claimed.

What’s v-computing? It’s voice-computing, of course. I didn’t just come up with v-computing off the top of my head; there’s actually reasoning behind the idea. Broad-based technological innovation comes in 15-year cycles, and I simply did the math. In 1945, Whirlwind One—the first mainframe computer—debuted, followed by the advent of the minicomputer around 1960. The age of the PC dawned in 1975, and in 1990, Tim Berners-Lee was putting the final touches on the Web in the Cern laboratory in Geneva, Switzerland.

The trend indicates that the next killer app will not arrive before 2005. But why voice-computing? Computing is still too



Gary J. Beach

complicated, particularly when it comes to information input. (I have given up trying to teach my wife how to use a mouse!)

By 2005, the power of the microprocessor will be light years ahead of what it is today. Hopefully by that time all the pent-up bandwidth will be deployed, and elegant LCD monitors—equipped with the microphones, cameras and speakers that today are passive complements—will become the prime interface to computing. Want to turn your computer on in 2005? Just say “on.” Voice-recognition software will act as your primary security defense by identifying you as you. Voice-dictation software will create and edit documents much faster than any keyboard can. Powerful cameras embedded in every LCD, combined with pervasive bandwidth, will at last usher in the age of videoconferencing and incredibly rich entertainment options.

We will speak to our computers. And they will speak to us, replacing forever the silly pop-up instruction boxes found in so many current desktop applications.

Let your voice be heard on this topic. What do you think will be the next killer application? When will it arrive? Drop me an e-mail and let me know.



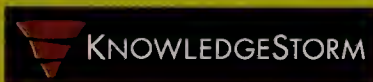
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Interview

BY LAFE LOW

DAVID Kennard

In his forthcoming TV special 2001: HAL's Legacy (premiering Nov. 27 on PBS), Emmy award-winning documentary producer David Kennard looks at the effect 1968's 2001: A Space Odyssey has had on today's technology and technologists. To hear the complete interview with Kennard, go to www.cio.com/radio.

CIO: To what extent has Stanley Kubrick's film—based on Arthur C. Clarke's novel—**influenced actual technology?**

Kennard: It stimulated the imaginations of kids going into the [artificial intelligence] field. It set the bar so high, [it stated that] until you make a machine that can do what HAL can do, you ain't made it.

The film portrayed a creature, HAL, with which we would simply have to learn to live. That strikes me as one of the most important messages of the film. It isn't a case of *if*, it's a case of *when* we get machines that are so powerfully intelligent, we will have to work out a *modus vivendi*. A large part of what HAL could do, [current technology] can do, but we can't get

them all onto one platform. Putting them all together is going to be the real tough thing.

Do you know of particular scientists who were inspired by 2001?

One of the most interesting and influential is Rodney Brooks, the director of the MIT AI lab. HAL stimulated [Brooks] to go into the field. He says, "I have no doubt in principle that we can make a machine as intelligent as a human being." The problem is, in practice are we smart enough to make anything smarter than ourselves? In the course of trying, we will actually shed more light on how the human brain works.

What science fiction do you find particularly influential?

Jules Verne's work back in the 19th century was very important because he made a voyage to the moon or a submarine believable. Once you've made something believable, you've gone a long way toward making it

inevitable. That's the role of the best science fiction. Once people can comfortably hold it in their minds, then the scientific imagination will start working on it. Two types of science fiction are compelling. One is the Arthur C. Clarke type. In terms of the scientific and practical environment in which things take place, it is believable. It doesn't break the laws of physics as we know them. The other type of first-class science fiction writer is Ursula Le Guin. She describes the likely effects on human beings of being in wholly different environments. If it were possible, for example, to live 1,000 years, what would the implications be for our ethics, our sense of morality or our parenting? Those kinds of questions can help us understand ourselves better. **CIO**

Did science fiction influence your career choice? Tell Features Editor Lafe Low at lflow@cio.com.



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